The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 134, No. 17 — CHICAGO, ILLINOIS — AUGUST 23, 1947

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PULMONARY EMBOLISM IN MEDICAL PATIENTS

A Comparison of Incidence, Diagnosis and Effect of Treatment in Two Hundred and Seventy-Three Cases at the Massachusetts General Hospital in Two Five Year Periods (1936 to 1940 and 1941 to 1945 Inclusive)

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Pulmonary embolism in medical patients is not infrequent and, contrary to general opinion, is actually commoner than pulmonary embolism occurring postoperatively. It has often been overlooked during the life of the patient even by experienced physicians, and it is still clinically diagnosed in probably less than half of the medical patients in whom it is discovered at autopsy. It was the experience of one of us (P. D. W.) [1] five years ago that pulmonary embolism was diagnosed personally nearly ten times as often in the decade from 1931 to 1940 inclusive as in the previous decade from 1921 to 1930, although the patients suffered from the same kinds and degrees of cardiac disease in the two decades. The answer obviously was twofold: first, the possibility of this condition was borne in mind and second, the criteria for diagnoses became more clearly defined with experience.

Death from pulmonary embolism is still a dreaded complication in hospitalized patients. Only a few years ago preventive measures directed against this fearsome event were practically nil and therapeusis was almost entirely conservative. Occasional heroic attempts at the Trendelenburg operation were met with almost routine failure. The phlebitis which was frequently associated with the embolic episode was treated solely by heat, rest and elevation of the affected part.

In recent years a decided interest in thromboembolic disease has been reflected in the large number of articles appearing in the literature on this subject. Most of this material has emphasized the frequency of pulmonary embolism in surgical patients, that is, after operative intervention, fractures and childbirth. Prophylaxis has been emphasized,[2] and treatment has been suggested along two lines: (*a*) interruption of the femoral veins [3] and (*b*) use of the anticoagulants heparin [4] and "dicumarol." [5]

At the Massachusetts General Hospital the chief method of treatment of thromboembolic disease in surgical patients during the last seven years has been bilateral interruption of the femoral veins. Because of the beneficial results obtained by this form of therapy in the surgical cases, it was natural that an increased interest in pulmonary embolism and infarction in medical patients was aroused. This interest was further stimulated in 1940 by the work of Hampton and Castleman.[6] In a study of the postmortem observations in a group of 370 cases of pulmonary embolism 40 per cent were postoperative and the remaining 60 per cent occurred in medical patients, approximately half of whom had cardiac disease. They also found that with the possible exception of those in the cardiac group 95 per cent of the emboli arose from the veins of the legs.

The purpose of this paper is to analyze the cases of pulmonary embolism occurring in medical patients at the Massachusetts General Hospital from 1936 to 1945, a ten year period, and to compare the results of conservative treatment in the five year period from 1936 to 1940 with those obtained in a second five year period (1941 to 1945) during which interruptions of the femoral veins were carried out.

Femoral vein interruption in these medical patients has, as a rule, been preferred by us to anticoagulant therapy because of its immediate control of the danger and because of its greater practicability in clearing the threat of recurrent or chronic leg vein thrombosis once and for all, especially in cardiac cases of complete or partial invalidism with myocardial failure and resulting peripheral circulatory stasis.

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Read before the annual meeting of the American Heart Association, San Francisco, June 28, 1946 and at the second Inter-American Cardiological Congress, Mexico City, Mexico, Oct. 10, 1946.

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INCIDENCE OF EMBOLISM AND INFARCTION

The incidence of pulmonary embolism and infarction in medical and surgical patients for the years 1936 to 1945 was determined (table 1). During that period there were 45,523 admissions to the medical services and 98,642 admissions to the surgical services. Since

TABLE 1.—*Incidence of Pulmonary Infarction or Embolism in Medical and Surgical Patients*

	Total Cases		Cases of Infarct or Embolism		Percentage	
Year	Medical	Surgical	Medical	Surgical	Medical	Surgical
1936	4,558	9,609	7	12	0.15	0.12
1937	4,578	9,806	27	24	0.56	0.24
1938	4,587	9,342	34	32	0.74	0.34
1939	4,597	9,695	31	22	0.65	0.24
1940	4,600	9,886	23	19	0.46	0.19
1941	4,569	10,610	35	28	0.70	0.26
1942	4,638	10,626	36	28	0.74	0.26
1943	4,590	10,687	12	19	0.27	0.17
1944	3,860	9,945	46	29	1.19	0.29
1945	3,836	9,346	22	25	0.57	0.27
Total	45,523	98,642	273	238		
Average yearly incidence					0.60	0.24

TABLE 2.—*Pulmonary Embolism in Medical Patients*

	Group A 1936-1940		Group B 1941-1945		Total Number of Cases 1936-1945
	No.	%	No.	%	
Number of cases	122		151		273
Definite (autopsies)	34	27.8	56	37.0	
Definite (clinically)	74	60.7	74	49.0	
Probable	14	11.5	21	14.0	
Deaths	52	42.6	73	48.0	
Autopsies	34	65.3	56	76.7	

there were 273 cases of pulmonary embolism on the medical services and 238 cases on the surgical services, the mean incidence of pulmonary embolism or infarction during the years 1936 to 1945 was 0.6 per hundred patients on the medical services and 0.24 per hundred patients on the surgical services. In this ten year period 53.4 per cent of all cases of pulmonary embolism occurred in medical patients. This figure corresponds roughly with that given by Hampton and Castleman.[6]

CLASSIFICATION, DEATHS AND AUTOPSIES

The 273 cases of pulmonary embolism or infarction observed in medical patients during the ten year period have been divided into two groups: *A*, 122 cases occurring during 1936 to 1940, inclusive, and *B*, 151 cases for 1941 to 1945, inclusive. In table 2 these groups have been subdivided into three classes. The definite (autopsy) cases were those proved by postmortem examination. The definite (clinical) cases were those in which the clinical diagnosis was strongly supported by the physical observations, including thoracic pain and bloody sputum, the roentgenogram of the chest and the electrocardiogram. The probable cases were those in which the diagnosis of embolism or infarction was definite but was not always supported by all criteria. The percentage of cases in each classification was roughly the same for both five year periods.

In group *A* there were 52 deaths, a mortality rate of 42.6 per cent, and there were 34 autopsies, an autopsy percentage of 65.3. In group *B* there were 73 deaths, a mortality rate of 48 per cent, and there were 56 autopsies, an autopsy percentage of 76.7.

SEX AND AGE

An analysis of groups *A* and *B* (table 3) reveals that in both groups there was a slight predominance of male patients. In group *A* there were 69 males (56.5 per cent) and in group *B* there were 91 males (60.3 per cent). The striking influence of age on the incidence of pulmonary embolism is also shown in table 3. In group *A* 83.8 per cent of the cases and in group *B* 87.4 per cent occurred in patients over 40 years of age. These figures agree with a similar analysis in surgical patients published in 1943 by Allen, Linton and Donaldson.[5b]

RELATIONSHIP OF HEART DISEASE TO PULMONARY EMBOLISM

The impression has long existed that the rate of blood flow is an important factor in regulating the formation of thrombus. This has been pointed out by Murray and MacKenzie[4b] and de Takats,[3c] among others. In a similar manner cardiac disease has long

TABLE 3.—*Sex and Age*

		Group A 1936-1940 122 Cases			Group B 1941-1945 151 Cases		
		No.	%		No.	%	
Sex	Male	69	56.5		91	60.3	
	Female	53	43.5		60	39.7	
Age	0 - 10	0	0.0		0	0.0	
	10 - 20	1	0.8		3	2.0	
	20 - 30	9	7.4		3	2.0	
	30 - 40	10	8.0		13	8.6	
	40 - 50	24	19.7		22	14.6	
	50 - 60	34	27.9		42	27.8	
	60 - 70	28	23.0	83.8	44	29.1	87.4
	70 - 80	15	12.4		22	14.6	
	80+	1	0.8		2	1.3	
	Total	122	100.0		151	100.0	

TABLE 4.—*Relationship of Cardiac Disease*

	Group A 1936-1940 122 Cases		Group B 1941-1945 151 Cases	
	No.	%	No.	%
Cardiac	72	59.0	107	70.8
Noncardiac	50		44	
Previous disease				
Hypertensive heart disease	36		33	
Rheumatic heart disease	30		31	
Coronary heart disease	16		25	
Phlebitis	19		11	
Clinical diagnosis on admission				
Congestive failure	32		58	
Pulmonary infarct or embolism	23		32	
Pneumonia	13		17	

been linked with venous thrombosis and pulmonary embolism. As previously stated, Hampton and Castleman[6] found that 60 per cent of their cases of pulmonary embolism were in medical patients, half of whom had cardiac disease.

In our study we found an even higher incidence of cardiac disease (table 4), which afflicted 59 per cent of the patients in group *A* and 70.8 per cent of those

in group *B*. There was a frequent history of hypertensive, rheumatic or coronary disease of the heart.

In at least one third of the patients in each group the clinical diagnosis on admission was congestive heart failure. This observation coincides with the old belief that venous stagnation plays an important role in thromboembolic disease.

TABLE 5.—*Analysis of Symptoms*

	Group A 1936-1940 122 Cases		Group B 1941-1945 151 Cases	
	No.	%	No.	%
Symptoms				
Pain in the chest	60	49.1	86	56.9
Dyspnea	39	31.9	54	35.7
Hemoptysis	14	11.4	28	18.5
Admitted with symptoms of infarct	60		90	
Infarct after admission to hospital	62		61	

TABLE 6.—*Clinical Chart*

	Group A 1936-1940 122 Cases	Group B 1941-1945 151 Cases
Temperature		
100 F. or over on admission	57	46
Sharp rise in hospital (58 to 102 F.)	47	42
Pulse rate		
100 or over on admission	42	36
Sharp rise in hospital (80 to 110)	60	42
Respiratory rate		
30 or over on admission	27	21
Sharp rise in hospital (20 to 30)	48	33

An admission diagnosis of pulmonary infarct or embolus (table 4) was made relatively more frequently in group *B* than in group *A*. This was probably due to the increased interest in pulmonary embolism and infarction during the period 1941 to 1945.

ANALYSIS OF SYMPTOMS

Table 5 points out briefly the commoner symptoms of infarction or embolism found in both groups. Pain in the chest was the symptom most frequently observed (49.1 per cent and 56.9 per cent) and was associated at times with either dyspnea (31.9 per cent and 35.7 per cent) or hemoptysis (11.4 per cent and 18.5 per cent). Those symptoms have been shown to predominate by other writers, among them Krause and Chester,[7] who found hemoptysis in 47, or 65 per cent, and thoracic pain in 23, or 32 per cent, of a group of 73 patients with pulmonary infarction.

The symptoms of infarction either were present at admission or developed during a definite episode while the patients were in the hospital.

CLINICAL CHART

Allen [8] has pointed out the frequency with which a simultaneous rise of temperature, pulse rate and respiratory rate may be the first indication of pulmonary embolism. Table 6 reveals that in both groups in our study this phenomenon was frequently observed. At times this change occurred hours before any other subjective symptom or sign of embolism appeared. In recent years at the Massachusetts General Hospital an unexplained concomitant elevation of temperature, pulse rate and respiratory rate calls for a meticulous search in an effort to rule in or rule out thromboembolic disease as a causative factor.

PHYSICAL EXAMINATION

The usual pulmonary observations on physical examination of patients in both groups of pulmonary embolism or infarction were rales, dulness and diminished breath sounds (table 7). In less than 10 per cent of either group was a friction rub found during physical examination. Signs of fluid were reported in a relatively small per cent of each group.

ROENTGENOGRAPHIC DATA

The most interesting observation in an analysis of the roentgenographic interpretations for the ten year period 1936 to 1945 was the increased frequency with which a definite diagnosis of infarction was made during the second five year period. In group *A*, as shown in table 8, a diagnosis of infarction was made only 36 times (33.3 per cent). In group *B* a diagnosis of infarction was made on 73 occasions, or in 60 per cent of the cases, and at the same time the indefinite interpretation, consolidation, was made much less frequently in group *B*. The increased ability of the members of the department to make a definite diagnosis of infarction coincided with the increase in general interest in thromboembolic disease. Fleischner, Hampton and Castleman [8] in 1941 published an article which did much to establish the roentgenographic diagnosis of pulmonary infarction. In those cases (table 8) in which infarction or consolidation were not reported,

TABLE 7.—*Observations on Physical Examination*

	Group A 1936-1940 122 Cases		Group B 1941-1945 151 Cases	
	No.	%	No.	%
Rales	60	49.1	95	62.9
Dulness	68	55.7	40	26.4
Diminished breath sounds	28	22.9	21	13.9
Friction rub	12	9.8	13	8.6
Fluid	22	18.0	19	12.5

TABLE 8.—*Roentgenographic Observations*

	Group A 1936-1940 108 Cases		Group B 1941-1945 122 Cases	
	No.	%	No.	%
Infarct	36	33.3	73	60.0
Consolidation	52	48.2	23	18.9
Fluid	10	9.3	12	9.8
Atelectasis	6	5.5	6	4.9
Clear	4	3.7	8	6.5

the usual observations were fluid or atelectasis. There was a small percentage of patients in each group in whom normal lung fields were reported.

ELECTROCARDIOGRAPHIC INTERPRETATION

Murnaghan, McGinn and White [9] have described the changes in the electrocardiographic pattern found in

7. Krause, G. E., and Chester, E. M.: Infarction of the Lungs: A Clinical and Roentgenological Study, Arch. Int. Med. 67: 1144-1156 (June) 1941.

8. Fleischner, F.; Hampton, A. O., and Castleman, B.: Linear Shadows in the Lungs, Am. J. Roentgenol. 46: 610-618 (Nov.) 1941.

9. Murnaghan, D.; McGinn, S., and White, P. D.: Pulmonary Embolism With and Without Acute Cor Pulmonale, with Especial Reference to the Electrocardiogram, Am. Heart J. 26: 573-597 (May) 1943.

the presence of pulmonary infarction and embolism. They have pointed out the obscuring influence of preexisting cardiac disease and the necessity for early study in cases in which right ventricular strain is only temporary. In table 9 are listed the electrocardiographic interpretations in both groups. The most frequent aberrations from normal were due to coexisting disease

TABLE 9.—*Electrocardiographic Interpretation*

	Group A 1930-1940 72 Cases		Group B 1941-1945 118 Cases	
	No.	%	No.	%
Auricular fibrillation	24	33.3	30	25.4
Coronary heart disease	10	13.8	26	22.0
Myocardial infarct	6	8.3	15	12.7
Digitalis effect	18	25.0	17	14.4
Cor pulmonale complex	17	23.6	14	11.8
Right bundle branch block	3	4.1	6	5.0
Normal	12	16.6	12	10.0

of the heart. However, in 23.6 per cent of those examined in group *A* and in 11.8 per cent of those examined in group *B* there were changes which fell into the pattern designated as cor pulmonale complex. This complex consists in (1) the appearance of an S wave in lead 1, or its exaggeration if already present; (2) the appearance of a Q wave in lead 3, or its exaggeration if already present; (3) the inversion of the T waves in lead 3, or deepening of inverted T waves if already present; (4) the inversion of the T waves in the precordial leads overlying the right ventricle, CF_2 to CF_4, and (5) the lowering to inversion of the T waves in lead 2. In addition right bundle branch block had infrequently been associated with the complex.

AUTOPSY OBSERVATIONS

There were 34 autopsies in group *A* and 56 autopsies in group *B* (table 10). The pathologic observations of interest in our study of pulmonary embolism and infarction were chiefly related to the lungs, the heart and the veins of the legs. Pulmonary embolus and/or infarct was found in all cases. In group *A*, 17 of 34 autopsies (50 per cent) showed massive pulmonary emboli; in group *B* there were 10, or 17.8 per cent, among 56 autopsies. We believe that this definite reduction in the frequency of massive embolus is related to the attempt in recent years to be on the lookout for warning signs or symptoms of infarction or phlebitis so that measures to prevent fatal embolism may be taken. Welch and Faxon [10] have pointed out that 1 of 4 patients in whom there develop nonlethal pulmonary embolisms is apt to die of massive pulmonary embolism.

Associated cardiac disease was a common observation in the postmortem examination in both group *A* and group *B* (table 10). Rheumatic heart disease was found in 23.5 to 30.3 per cent of the cases. Myocardial infarction, recent or old or both, was found in 20.5 to 42.8 per cent of the cases. Mural thrombus formation likewise was frequently observed.

An interesting observation was that bilateral or right-sided mural thrombosis was found only in 11.4 per cent of the patients in group *A* and in 14.2 per cent of those in group *B*. In most of the standard textbooks and systems of medicine the right side of the heart is indicated as the origin of pulmonary embolism in medical patients, especially those with cardiac disease. More recently, the veins of the legs have been pointed out to be the source of pulmonary emboli. Hampton and Castleman [9] reported that with the possible exception of the cardiac group 95 per cent of the pulmonary emboli seemed to arise from the veins of the legs. Barker and associates [11] in a study of 1,665 consecutive cases of postoperative venous thrombosis and pulmonary embolism found thrombosis in the lower extremities in 85 per cent of their cases.

In our study of the postmortem examinations of medical patients we found scattered instances (table 10) of isolated thrombosis of the vena cava, the iliac veins and the pelvic veins, but in group *A* 78.9 per cent and in group *B* 75 per cent of those in whom the veins of the legs were examined showed thrombosis. These figures are in decided contrast to the observations for thrombi originating in the right side of the heart and would appear strongly to designate the veins of the legs as the usual origin of pulmonary embolism and infarction. Unfortunately, examination of the peripheral veins is not always accomplished in postmortem examinations. This important omission is usually due either to autopsy restrictions or to haste on the part of the examiner.

It is interesting to note that, in the 30 cases in group *B* in which thrombosis of the veins of the legs was found, 9 were patients who had undergone interruption of the femoral vein. In these 9 postoperative cases clot was found proximal to the ligature in 5 instances, but none of these patients had had massive clinical pulmonary episodes following venous interruption.

INTERRUPTION OF THE FEMORAL VEIN

From 1941 onward at the Massachusetts General Hospital interruption of the femoral vein was undertaken in cases in which a diagnosis of pulmonary embolism or infarction had been made in medical patients. Homans had demonstrated the efficacy of this procedure some time previously.[9a] Interruption of the femoral veins had already been instituted on the

TABLE 10.—*Autopsy Observations in Ninety Cases of Pulmonary Embolism in Medical Patients*

	Group A 1930-1940 34 Autopsies		Group B 1941-1945 56 Autopsies	
	No.	%	No.	%
Lungs				
Pulmonary embolus	18		37	
Massive	17		10	
Pulmonary infarct	32		49	
Peripheral venous thrombosis				
Not examined	15		16	
No clot found	0		0	
Vena cava alone	1		1	
Veins of pelvis alone	2		0	
Iliac veins alone	1		1	
Femoral and/or popliteal veins	15 (78.9% of those examined)		39 (75.0% of those examined)	
Heart				
Rheumatic heart disease	8	23.5	17	30.3
Myocardial infarct	7	20.5	24	42.8
Recent and old	3		7	
Recent	0		8	
Old	4		9	
Mural thrombi	14	41.1	30	53.5
Left (either chamber)	10	29.4	22	39.2
Right (either chamber)	3	11.7	2	14.3
Bilateral	1		6	

10. Welch, C. E., and Faxon, H. H.: Thrombophlebitis and Pulmonary Embolism, J. A. M. A. **117**: 1502-1508 (Nov. 1) 1941.

11. Barker, N. W.; Nygaard, K. K.; Walters, W., and Priestley, J. T.: A Statistical Study of Post-Operative Venous Thrombosis and Pulmonary Embolism: IV. Location of Thrombosis; Relation of Thrombosis and Embolism, Proc. Staff Meet., Mayo Clin. **16**: 33-37 (Jan. 15) 1941.

surgical services, and the results of the procedure since then have been reported by Allen and his co-workers.[2b, d]

Table 11 reveals that in the 151 cases of group *B* (1941 to 1945) there were 60 operations to interrupt femoral veins. At first a unilateral interruption was performed as a rule. In 1941 and 1942 when interruptions of the femoral vein were relatively new and the procedure had not been standardized, it was considered that a unilateral operation on the apparently involved side was the procedure of choice. It soon became evident, however, that a bilateral operation gave the patient much more protection; several cases were reported in which large emboli arose postoperatively from the supposedly uninvolved side. Since 1943 bilateral operations have been done routinely (table 11), even though the signs of venous thrombosis are present in only one extremity.

TABLE 11.—*Interruptions of Femoral Veins*

Year	Unilateral			Bilateral			Total
	Common	Superficial	Vein Not Designated	Common	Superficial	Vein Not Designated	
1941	3	1	1	..	..	1	6
1942	1	3	..	4	2	3	13
1943	..	..	..	2	4	1	7
1944	..	..	..	4	19	1	24
1945	..	..	..	..	7	3	10
Total	4	4	1	10	32	9	60

TABLE 12.—*Location of Thrombus*

Year	No. of Patients	Common Femoral Vein	Superficial Femoral Vein
1941	6	2	3
1942	13	3	1
1943	7	3	0
1944	24	3	0
1945	10	1	0
Total	60	12	4

In 60 patients, 14 had the common femoral vein interrupted distal to the saphenofemoral junction and 36, the superficial femoral veins distal to the profunda femoris vein. In 10 cases the procedures were not clearly designated in the operative note but were in all probability performed on superficial femoral veins. We consider that in this group of patients, chronically ill with cardiac disease for the most part, interruption of the common femoral vein is indicated in order to eliminate the profunda femoris vein as a source of secondary emboli.

Thrombus was found at the time of operation in the common femoral vein on 12 occasions and in the superficial femoral vein 4 times (table 12). In the last two years of the study, 1944 and 1945, thrombus was found at operation in only 4 of 34 cases as compared to this observation in 5 of 6 cases in 1941. This indicates that the operative procedures are now being undertaken sooner and that the thrombi, which originate usually in the calf, have not had time to propagate as far as the level of the femoral veins.

There were a few cases of persistent swelling, sepsis and lymphatic fistula reported as complications in this group of 60 operations. The complication of greatest interest, however, is probably that of postoperative pulmonary infarction (table 13).

There were 13 of the 60 patients who had postoperative episodes which strongly suggested pulmonary infarction. On analysis of these 13 cases it was found that none of the secondary episodes was massive or fatal. It was also found that only 2 of the secondary infarctions occurred in patients whose common femoral veins had been interrupted. Eleven of the 13 episodes followed interruption of the superficial femoral veins. This would seem to bear out the belief that in this particular group of chronically ill patients interruption of the common femoral vein should be the procedure of choice.

There were 17 deaths in the 60 patients with operative intervention. In the 91 patients of group *B* who were not operated on plus the 122 patients of group *A*, a total of 213 cases, there were 108 deaths. The mortality rate (table 14) for this operated group is therefore 28.3 per cent and that for nonoperated cases 50.7 per cent. Since the patients who had interruptions of the femoral veins were not selected because of their good risk qualities, we consider that this method of treatment has been of definite significance in reducing the death rate from pulmonary embolism in medical patients.

The mortality in these medical patients, the considerable majority of whom had serious heart disease, has of course been far greater than that in surgical (postoperative) patients undergoing the same operative interruption of the femoral veins for pulmonary embolism. The reason lies, of course, in the precarious cardiac status of the medical patients, who may die of heart failure despite their temporary rescue from fatality due to the complicating pulmonary embolism.

TABLE 13.—*Complications After Interruption of Femoral Veins*

Year	No. of Patients	Swelling	Sepsis	Lymphatic Fistula	Pulmonary Infarct
1941	6	2	..	..	2
1942	13	..	..	1	3
1943	7	..	..	1	1
1944	24	3	3	..	5
1945	10	..	2	..	2
Total	60	5	5	2	13*
Incidence		8.3%	8.3%	3.3%	21.6%

* Eleven, or 85%, of these patients had interruption of the superficial femoral veins only.

TABLE 14.—*Influence of Interruption of Femoral Veins on Mortality Rate in 273 Medical Patients with Pulmonary Embolism*

	Operated Group	Nonoperated Group
Number of patients	60	213
Number of deaths	17	108
Mortality	28.3%	50.7%

SUMMARY AND CONCLUSIONS

1. An analysis has been made of the incidence, symptoms and signs and treatment of pulmonary embolism in medical patients at the Massachusetts General Hospital during two five year periods, from 1936 to 1940 inclusive (group *A*) and from 1941 through 1945 (group B).

2. During the entire ten years the ratio of patients with pulmonary embolism on the medical wards (0.6

per cent) was more than twice that on the surgical wards (0.24 per cent). Although there were actually more than twice as many surgical cases (98,642) as medical (45,523), more than half (53.4 per cent) of all the patients with pulmonary embolism were medical (273 as compared to 238 surgical).

3. Of the 273 medical cases of pulmonary embolism 122 were diagnosed during the first five years and 151 during the second, the larger incidence being due in part at least to improvement in diagnostic ability.

4. Male patients predominated, making up 56.5 per cent of the first group and 60.3 per cent of the second.

5. The great majority of the patients were over 40 years of age (83.8 per cent), and over half were from 50 to 70 years of age.

6. The majority of the patients had cardiac disease (59 per cent in group *A* and 70.8 per cent in group *B*). All types of cardiac disease were represented, especially the rheumatic, hypertensive and coronary forms. Congestive failure was frequent as a background, and auricular fibrillation was present in nearly one third of the patients.

7. Of symptoms, pain in the chest (chiefly pleural) was the commonest but not the earliest, being found in about half the cases (49.1 and 56.9 per cent in groups *A* and *B*, respectively). Dyspnea was present in one third (31.9 and 35.7 per cent), but hemotysis occurred only in a relatively small group (10.4 and 18.5 per cent). Tachycardia out of proportion to the degree of fever or dyspnea was a prominent sign. Physical abnormalities in the chest were often absent; a pleural friction rub was found in less than 10 per cent of the cases (9.8 and 8.6 per cent).

8. The roentgenologic diagnosis of pulmonary infarction improved considerably in the second five year period as compared with that in the first (57:33 per cent).

9. The electrocardiographic pattern of the acute cor pulmonale was evident in about one fifth of the patients who were so examined.

10. Autopsies in 90 (72 per cent) of the 125 patients who died showed massive embolism in 50 per cent, but only in a few cases (12) were mural thrombi found in either chamber of the right side of the heart. In over 75 per cent of the cases in which the veins of the legs were examined thrombosis therein was disclosed.

11. In only 1 case encountered during the first five year period were the femoral veins interrupted; but in the second period the operation was done bilaterally on either the superficial or common femoral veins (the latter are the preferable sites) in 60 patients, with a reduction of early mortality (within one month) to 28.3 per cent as compared with 50.7 per cent in those without operative treatment, the remaining deaths being in large part the result of congestive heart failure and not of recurrent pulmonary embolism.

12. The possibility of pulmonary embolism in medical patients, especially in cardiac cases, should be constantly borne in mind and when discovered, should be treated by bilateral interruption of the common femoral veins to prevent recurrent embolism which could prove fatal. This interruption must always be distal to the sapheno-femoral junction because if it is done proximal to it persistent lymphedema of the entire extremity will develop; we have also pointed out that this interruption should be proximal to the profunda femoris.

THROMBOSIS OF THE CAVERNOUS SINUS

Newer Concepts in Its Management and Report of Three Cases

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Though thrombosis of the cavernous sinus is not common, it is not sufficiently rare to warrant reporting isolated cases unless they possess some unusual aspects. In this article we have endeavored to survey the existing literature, both before and since the advent of chemotherapy and the anticoagulants, and to report 3 cases with unusual aspects.

The term "cavernous sinus thrombosis" is used in a generic sense and includes cases of phlebitis, thrombophlebitis and phlebothrombosis as well as true aseptic thrombosis. By far the majority of cases reported are of septic origin and would therefore be classified as phlebitic or thrombophlebitic. Aseptic thrombosis and phlebothrombosis are usually secondary to trauma, a failing circulation or to other noninfectious inflammation of the cavernous sinus.

Although thrombosis of the cavernous sinus is usually unilateral in its clinical manifestations, there is almost always bilateral involvement histopathologically because of the anatomic communications between the two cavernous sinuses by way of the anterior and posterior basilar sinuses, situated on the floor of the sella turcica under the pituitary body.

HISTORICAL DATA

The first case of thrombosis of the cavernous sinus observed at autopsy was described by Duncan [1] in 1821. The first clinical report was made by Vigla [2] in 1839. In 1902 Dwight and Germain [3] surveyed the literature and collected 178 cases, to which they added 4 of their own, and in 1918 Smith [4] estimated that 300 cases had been reported since the disease was first recognized. In 1936 Grove [5] published an extensive survey of the literature up to that time and noted that the total number of reported cases was "not much in excess of 400." Obviously there had been more cases, but many were undiagnosed and not all diagnosed cases were reported. It is not always possible to establish the diagnosis clinically, and, as pointed out by Eagleton,[6] the cavernous sinus is not always examined at autopsy in obscure cases of septicemia. The cases cited and reported by Grove [5] occurred before the availability of chemotherapeutic drugs and showed an extremely grave prognosis. To quote from Grove,[5] "The percentage of recovery from all types of thrombosis of the cavernous sinus is probably not greater than 7 per cent. The percentage of recovery from the purely aseptic types is considerably higher than this." Since 1936 many

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1. Cited by Chisolm, J. J., and Watkins, S. S.: Twelve Cases of Thrombosis of Cavernous Sinus, Arch. Surg. 1: 483-512 (Nov.) 1920.

2. Cited by Dixon, O. J.: The Pathologic Examination in Cavernous Sinus Thrombosis, J. A. M. A. 87: 1088-1092 (Oct. 2) 1926.

3. Dwight, E. W., and Germain, H. H.: Thrombosis of Cavernous Sinus with Report of Four Cases, Boston M. & S. J. 146: 456-461, 1902.

4. Smith, D.: Cavernous Sinus Thrombosis, Arch. Ophth. 47: 482-496 (Sept.) 1918.

5. Grove, W. E.: Septic and Aseptic Types of Thrombosis of Cavernous Sinus, Arch. Otolaryng. 24: 29-50 (July) 1936.

6. Eagleton, W.: Cavernous Sinus Thrombophlebitis, New York, The Macmillan Company, 1926.

cases have been reported in which the sulfonamide compounds and penicillin have been employed, and the recovery rate has been much higher. No attempt will be made to present a complete bibliographic review of the cases reported thereafter, because little would be gained by such a review. The primary advances in the cases reported since 1936 are the use of sulfonamide drugs, penicillin and anticoagulants, the general abandonment of surgery of the cavernous sinus and the much higher rate of recovery.

ETIOLOGY

There are two primary types of thrombosis of the cavernous sinus: aseptic thrombosis and septic thrombosis. The aseptic type may result from trauma to the head (as in fractured skull); from direct trauma to the sinus from puncture wounds, either by violence or operative accident, or from a failing circulation in debilitated patients at the extremes of life (marasmic thrombosis). In the last group the thrombosis is always sterile and seldom primary, whereas in the traumatic group the thrombosis is usually sterile but the sinus may be directly infected at the time of injury. Traumatic thrombosis may occur as late as one month after injury.

The septic type of thrombosis is by far the commonest, is of infectious origin and is secondary to a focus elsewhere. As expressed by Lederer,[7] there are four recognized routes of infection:

1. Anterior foci: Such infections result from suppurations of the upper lip, ala nasi, vestibule of the nose and eyelids and spread by way of the angular, supraorbital and supratrochlear veins to the ophthalmic veins. This is the commonest route of infection.

2. Internal foci: These infections occur as a result of intranasal operations on the septum, turbinates and sinuses; after the use of the actual cautery in the nose during the stage of acute infections, and from suppuration of the posterior ethmoid and sphenoid sinuses, rarely the antrums. The infection is spread directly through the ethmoidal veins or through the wall of the sphenoid sinus.

3. Inferior foci: Such infections develop from peritonsillar abscess, operations on the tonsil, operations on osteomyelitis of the superior maxilla, maxillary dental extractions and deep cervical abscess. They spread by way of the pterygoid plexus or by direct proximal (retrograde) extension of the internal jugular vein through the lateral sinus and the petrosal sinuses.

4. Posterior foci: These infections occur as a result of extensive involvement of the middle ear and mastoid with lateral sinus phlebitis or thrombosis and spread in a retrograde manner through the petrosal sinuses to the cavernous sinus.

DIAGNOSIS

The onset of thrombosis of the cavernous sinus is usually manifested by a severe chill, a high temperature ranging from 102 to 105 F., extreme toxicity and perhaps nausea and vomiting. There is headache, but the patient is mentally alert until meningeal involvement occurs. The first localizing sign is definite edema of the bulbar conjunctiva and chemosis of the eyelids, with rapidly progressive exophthalmos of the eye on the affected side, usually becoming bilateral unless the disease is arrested or the patient dies. There is also limitation of the movement of the eye (abducens or sixth nerve paralysis), with concomitant alterations in sizes of the two pupils. Meningitis usually occurs rather early, after which the sensorium is decidedly affected. Fundal examination reveals dilatation of the retinal veins but seldom papilledema. There may be some swelling in the region of the mastoid on the affected side, owing to the exit in this region of an emissary vein in connection with the sinuses that communicate with the cavernous sinuses. Blood culture is usually positive if no chemotherapy has been administered.

The clinical diagnosis of this disease is usually not difficult. However, the absolute correctness of the diagnosis can only be established in those cases examined at autopsy. The acute onset, toxicity, sustained high fever and the characteristic ocular observations are classic signs of the disease.

Eagleton[8] presented certain criteria for establishing the diagnosis: (*a*) a known site of infection; (*b*) an infection of the blood stream; (*c*) early signs of venous obstruction; (*d*) involvement of the nerves in the sinus; (*e*) a neighborhood abscess of the soft parts, and (*f*) symptoms of complicating disease.

The two commonest conditions which must be differentiated from thrombosis of the cavernous sinus are orbital cellulitis and lateral sinus thrombosis. In the latter disease the onset is gradual and almost always follows an infection of the middle ear or of the mastoid or an infection in the neck. Fever is intermittent, and the temperature chart is typical, with extreme elevations associated with chills followed by remissions to normal. The blood culture is usually positive in thrombosis of either blood sinus (provided no chemotherapy has been administered), and involvement of the cavernous sinus may be a complication of lateral sinus thrombosis.

Orbital cellulitis remains unilateral and is unassociated with the extreme toxemia observed in thrombosis of the cavernous sinus. Retrobulbar aspiration usually proves positive in orbital cellulitis, and there is usually no alteration in the size of the pupils. There may be limitation of motion of the eyeball due to pressure, but a true paralysis of the cranial nerve does not occur.

Other conditions which must be considered in differential diagnosis are cellulitis of the cheek and face when accompanied by edema of the eyelids, infection of the ethmoids and frontal sinuses, tumors of the orbit and its contents and exophthalmos resulting from arteriovenous aneurysm.

THERAPY

Prior to the introduction of the sulfonamide drugs as therapeutic agents, the treatment of thrombosis of the cavernous sinus was most unsatisfactory and the prognosis was extremely grave whether medical management or surgical intervention was employed.

Although numerous operations were devised for the treatment of this disease, Eagleton[8] in 1926 succinctly stated the indications for surgical intervention as: (*a*) eradication of the original focus; (*b*) the establishment of as free drainage as possible through the original path of the infection, and (*c*) placing of the inflamed and thrombosed cavernous sinus at rest by ligation of the common or the internal carotid artery. He recognized that radical surgical procedures directed to the cavernous sinus itself had proved unavailing.

After the introduction of sulfanilamide in 1936, and the other sulfonamide compounds later, reports began

7. Lederer, F. L.: Disease of the Ear, Nose and Throat, Philadelphia, F. A. Davis Company, 1945.

to appear in the literature of cases in which a much higher incidence of recoveries occurred. Perhaps the earliest case of cavernous sinus thrombosis in the English literature in which sulfanilamide was employed was reported by MacNeal and Cavallo.[8] These authors reported a single case in which a patient with bacteremia and cavernous sinus thrombosis was given sulfanilamide in small doses for only two days, after which she became nauseated and refused the drug. She was then treated with blood transfusions, streptococcic serum and bacteriophage. Though the recovery cannot be attributed to the sulfanilamide, this case is cited to properly accredit the authors. Since this time many reports have appeared in which the sulfonamide drugs were used. In 1941 Lyons[9] reported 2 cases in which sulfonamide compounds were used in combination with the anticoagulant, heparin, with recovery in both instances. Schall,[10] continuing this work, reported 1 case in which sulfathiazole and heparin were employed, with recovery of the patient. In 1943 Lyons[11] reported the successful use of penicillin in combination with sulfathiazole in a case of cavernous sinus thrombosis. Welty[12] subsequently reported a case of thrombosis of the cavernous sinus in a white boy aged 13 in which sulfadiazine, penicillin and heparin were employed, with recovery. Wolfe and Gain[13] mentioned the possibility of using heparin and "dicumarol" in the treatment of the disease but did not employ either drug in the case reported by them. A careful review of the literature by us fails to reveal any report of a case in which "dicumarol" was employed, with or without other agents, so that the use of this drug in 1 of our cases may well represent its earliest use in treatment of this condition.

In view of our present knowledge of thrombophlebitis in general, it is our considered opinion that anticoagulant therapy is of great value in thrombosis of the cavernous sinus and that both heparin and "dicumarol" should be employed in every case. The intravenous administration of heparin produces an almost immediate but fleeting prolongation of the prothrombin time, whereas the oral administration of "dicumarol" produces a delayed but more sustained prolongation of the prothrombin time. The advantage of the quick action of heparin is offset by its costliness and the difficulty of its administration; in contradistinction, "dicumarol" is relatively inexpensive and is given orally. The practical application of these facts leads us to believe that in every case of cavernous sinus thrombosis both heparin and "dicumarol" should be given at once, with heparin being discontinued in twenty-four to forty-eight hours as the "dicumarol" becomes effective and the prothrombin time reaches the desired level. (Compare this with the combined use of regular insulin and protamine zinc insulin in the treatment of diabetes.)

8. MacNeal, W. J., and Cavallo, M. E.: Streptococcic Bacterenia and Apparent Thrombosis of the Cavernous Sinus with Recovery, J. A. M. A. **100**: 2139-2141 (Dec. 25) 1937.

9. Lyons, C.: The Treatment of Staphylococcal Cavernous Sinus Thrombophlebitis with Heparin and Chemotherapy, Ann. Surg. **113**: 113-114 (Jan.) 1941.

10. Schall, L. A.: Treatment of Septic Thrombophlebitis of the Cavernous Sinus, J. A. M. A. **117**: 581-584 (Aug. 23) 1941.

11. Lyons, C.: Penicillin Therapy of Surgical Infections in U. S. Army, J. A. M. A. **123**: 1007-1018 (Dec. 18) 1943.

12. Welty, R. F.: Bacterial Thrombophlebitis of a Cavernous Sinus with Recovery, Arch. Otolaryng. **43**: 70-72 (Jan.) 1946.

13. Wolfe, W. C., and Gain, J. F.: Thrombosis of the Cavernous Sinus, Arch. Otolaryng. **41**: 79-84 (Jan.) 1945.

REPORT OF CASES

CASE 1.[14]—M. J. H., a white girl aged 8 was readmitted to the hospital on Aug. 4, 1944 because of headache of three days' duration, high temperature and extreme toxicity.

The past history was entirely negative, except for a bilateral chronic otitis media. The patient had recently been advised to have a tonsillectomy and adenoidectomy. On July 21, 1944 these surgical procedures had been carried out with the patient under gas and ether anesthesia. The postoperative course was normal. The child was seen in the outpatient clinic on July 28 and discharged. On August 4 she was brought back to the outpatient clinic in obvious toxemia, with a temperature of 104 F. There was inequality of the pupils, the right one being larger than the left, but both reacted to light. There was some sour-smelling discharge in each ear canal, but no tenderness or edema over either mastoid. The remainder of the physical examination was negative.

Urinalysis was normal except for a trace of albumin. The red blood cell count was 3,170,000; there were 13,550 white blood cells, with polymorphonuclears 92 per cent, lymphocytes 5 per cent and monocytes 3 per cent; the hemoglobin was 66 per cent. The sedimentation rate was 18 mm. (Wintrobe, corrected). The blood sugar level was 188 mg. per hundred cubic centimeters after 1,000 cc. of 5 per cent dextrose solution had been administered intravenously. The nonprotein nitrogen level was 50 mg. per hundred cubic centimeters.

Examination of the spinal fluid revealed a pressure of 130 mm. of water, no cells and 13 mg. of protein per hundred cubic centimeters. A roentgenogram of the chest showed the heart and lungs to be normal. On roentgen examination of the mastoids an undeveloped cell structure was found on either side, with no evidence of destruction of the bone.

About six hours after admission there developed a definite exophthalmos with lateral rectus paralysis on the right side, and the patient became deeply stuporous. A fundal examination revealed essentially normal conditions. In spite of the administration of 1 Gm. of sodium sulfadiazine intravenously every four hours after admission and 50,000 units of penicillin at the first signs of exophthalmos, with 10,000 units every four hours thereafter, the child died at 12:40 a. m. on Aug. 6, 1944. The exophthalmos remained unilateral throughout.

Postmortem examination was refused.

CASE 2.—J. F. P., a white man aged 45, was admitted to the hospital on Jan. 9, 1945 at 11:45 p. m. on Dr. Louis Dobihal's service. History revealed a fever of ten days' duration and a swollen right eye of one day's duration. Ten days prior to admission of the patient a pain developed on the right side of the head with fever. A dental consultation revealed that six teeth on the left side were diseased, and these were extracted five days later. Three days before admission a high fever developed, and he was given sulfadiazine. This fever continued, and when the right eye became swollen the patient was hospitalized.

The family history was noncontributory. The past history revealed that in February 1944 the patient had some teeth removed from the left upper jaw; this necessitated scraping the bone and taking some sutures. The day following this he blew his nose and the discharge was bloody with pus. Since then he has frequently had sinusitis.

Physical examination on admission revealed an extremely ill white man with a temperature of 104.8 F. rectally, pulse rate 110, respiratory rate 18, and blood pressure 145 systolic and 90 diastolic. The left eye appeared normal. The right eyelids were decidedly edematous and swollen. There was some purulent discharge present in the conjunctival sac, and there was slight exophthalmos. The conjunctiva was injected. The pupils reacted to light and accommodation and appeared regular. There was pronounced limitation of motion of the eyeballs. Fundal observations were normal. The nasal turbinates were

14. Previously reported in the Bull. School Med. Univ. Maryland **29**: 15: 153 (Jan.) 1945.

bilaterally swollen and boggy, and there was some free mucopus posteriorly in the right middle meatus. There was definite rigidity of the neck, and the Kernig's sign was positive. There was hyperreflexia on the right, and a positive great toe reflex. The ears were normal, as were the heart, lungs and abdomen. The impression at that time was acute ethmoiditis with orbital extension and meningitis.

A spinal tap revealed the pressure to be 290 mm. of water. The Queckenstedt sign was negative. There were 5,600 white blood cells, 80 per cent polymorphonuclears, with a 3 plus reaction to the Pandy test. The smear revealed a few cocci of undetermined type, and the culture taken at this time was negative, as were all subsequent cultures. Ten thousand units of penicillin were administered intrathecally at this time, and the dosage was repeated twice a day for eight days. In addition the patient received 15,000 units of penicillin intramuscularly every three hours and 1 Gm. of sulfadiazine orally every four hours. Compresses of boric acid were applied constantly to the region of the right eye.

On admission the urinalysis revealed normal conditions. Examination of the blood disclosed: 57 per cent hemoglobin, 3,470,000 red blood cells, 15,600 white blood cells, 87 per cent polymorphonuclears and 13 per cent lymphocytes. The serologic test of the blood (Kahn) was negative, the nonprotein nitrogen 31 mg. and the blood sugar 120 mg. per hundred cubic centimeters. The sedimentation rate was 30 mm. (Wintrobe, corrected). The blood sulfadiazine level two days after admission was 7.6 mg. per hundred cubic centimeters.

The patient continued to run a septic temperature of 103 to 104 F. rectally for eight days. During this time the patient was delirious and continued unimproved. Intravenous fluids were given twice daily, and on the fifth day a retrobulbar exploration was done on the right eye by another surgeon. Pus was not found, and the same regimen was continued.

On the seventh day when the patient was seen in consultation by us he exhibited pronounced chemosis and injection of the bulbar and palpebral conjunctiva of the right eye. The lids were opened with difficulty because of extreme edema. The right pupil was dilated and fixed, and the fundus revealed dilatation of the veins and extreme narrowing of the arteries with indistinctness of the disk but without definite papilledema. There was decided exophthalmos. Visual acuity could not be determined because the patient was comatose. The nose was free of pus, and there was no tenderness elicted on palpation over the frontal, ethmoid or antral regions. The left eye was unaffected. An impression of cavernous sinus thrombosis was made, and the patient was given 500 cc. of whole blood at once. Sulfadiazine therapy was discontinued, and the intravenous injection of a solution of sulfapyridine sodium 2.5 Gm., twice daily, was begun. Penicillin therapy was continued intramuscularly. The patient began to improve and became responsive and rational on the ninth day but had only light perception in the right eye. The temperature began to drop and by the twelfth day was down to 100 F., rectally; the exophthalmos had begun to recede. The temperature returned to normal on the sixteenth day. The patient could now distinguish objects but could not read with this eye. The fundal picture had returned to normal.

The patient was discharged from the hospital on the thirty-second day and was able to read the smaller headlines of the newspaper. The exophthalmos had almost completely receded. The family physician has since reported that the vision returned to normal after a period of several months and there was no evidence of exophthalmos. Recent inquiry revealed that the patient was living and well without recurrence of the symptoms.

CASE 3.—V. H., a white woman aged 31, was admitted to the hospital on the medical service in diabetic coma on Oct. 27, 1945. One week prior to admission the patient had a cold, which was followed by severe frontal headache and profuse nasal discharge. On the evening of admission she became drowsy and could not be aroused; she was brought to the accident room at 9 p. m.

Family and past histories revealed that one brother had died at the age of 42 with diabetes, that the mother had died of pernicious anemia, and that the patient had been known to have diabetes for two and one-half years.

Physical examination on admission revealed that the patient was in coma and had the odor of acetone on her breath. The temperature was 98 F., the pulse rate 132 and the respiratory rate 24. The conjunctivas of both eyes were inflamed, and the lids were somewhat edematous, this being most pronounced on the right side. The eyeballs were soft; the pupils were round, regular, appeared of equal size and reacted sluggishly to light. Ocular motility could not be tested. There was a definite general deviation of the nasal septum to the left. The turbinates were swollen, the mucosa was injected, and there was mucopurulent discharge on both sides. Both ear drums were moderately injected but intact. There was poor oral hygiene and many dental caries. The postpharynx was injected. The remainder of the physical examination revealed essentially normal conditions. The impression at this time was diabetic coma with bilateral antral and ethmoid sinusitis.

On admission the urinalysis showed 4 plus acetone and 4 plus sugar; the blood sugar level was 225 mg. per hundred cubic centimeters. A diabetic regimen was promptly instituted, and the following morning the urine showed a 4 plus sugar, 3 plus acetone and a blood sugar level of 173 mg. The blood contained 68 per cent hemoglobin; 4.35 million red blood cells and 15,600 white blood cells with polymorphonuclears 89 per cent, lymphocytes 3 per cent and monocytes 3 per cent. The serologic (Kahn) test of the blood was 4 plus on two occasions, and the sedimentation rate was 30 mm. (Wintrobe, corrected).

Immediately on admission, compresses of boric acid were constantly applied to the region of the patient's right eye, and 20,000 units of penicillin was administered intramuscularly every three hours. On Oct. 28, 1945 she became responsive but complained of severe pain in the right eye. By October 31 she was unable to open it.

At this time (October 31) there appeared an exophthalmos of the right eye, and ophthalmologic and otolaryngologic consultations were requested. Examination revealed dimness of vision in the right eye with pronounced swelling and inflammation of the lids. The lids were stuck together with a purulent exudate. The conjunctiva was decidedly injected, and the right pupil was larger than the left but reacted to light. There was a definite exophthalmos of the right eye, and ophthalmoscopic examination revealed dilatation of the retinal veins, "boxcar" occlusion of the arteries and haziness of the disk margins. The left eye showed only slight swelling of the lids. The right side of the nose was completely blocked by a purulent, foul-smelling discharge, with much crusting and scabbing high up in the middle meatus. This material was removed, and a large septal perforation was found at the osseocartilaginous junction with dirty, gray, necrotic edges. Examination of the left side of the nose revealed some purulent discharge with a swollen middle turbinate. The throat and ears were normal. The impression at this time was ethmoiditis on the right side, with thrombosis of the cavernous sinus and septal perforation, which was probably syphilitic in origin.

In addition to the 20,000 units of penicillin already being given intramuscularly every three hours, the patient was started on a regimen of 1 Gm. sulfadiazine orally every four hours, and "dicumarol" therapy was instituted. Local nasal medication with 1 per cent ephedrine in isotonic solution of sodium chloride was also begun.

Roentgen examination of the sinuses revealed clouding of both antrums and of the left ethmoid. The frontal sinuses were clear.

The patient continued to be seriously ill. The prothrombin time was kept constantly elevated to 30 seconds (undiluted) by "dicumarol" therapy. Two days later the left eye manifested a definite exophthalmos with venous congestion of the retinal vessels and the pathologic conditions in the right eye had increased in intensity since the previous examination. The patient was given supportive treatment throughout, including transfusions of whole blood.

In spite of this therapy the patient's clinical course was stormy, and bilateral optic atrophy was soon evident. By Nov. 15, 1945 the diabetes was well under control, the temperature was normal and the nasal discharge had almost disappeared. One week later antisyphilitic therapy was begun, using oxophenarsine hydrochloride and a bismuth compound, and the patient's general condition began to improve slightly.

The right eye still exhibited considerable exophthalmos, and there was no perception of light.

For the remainder of her stay in the hospital, which totaled seventy-five days, the patient continued her gradual improvement. The exophthalmos completely disappeared on the left side and was minimal on the right. On her discharge the Kahn reaction of the blood was negative and the diabetes was well controlled with insulin and a dietary regimen. She was ambulatory though totally blind in both eyes.

SUMMARY

The use of the terms phlebitis, thrombophlebitis, phlebothrombosis and aseptic thrombosis of the cavernous sinus is discussed and a classification of septic and aseptic thrombosis is presented.

Three cases of cavernous sinus thrombosis are reported, 2 with unilateral involvement and 1 with bilateral involvement, with 2 recoveries.

In the first case the condition was unilateral and was thought to follow adenotonsillectomy. The patient died in spite of the administration of sulfadiazine sodium intravenously and penicillin intramuscularly.

The second case followed dental extraction with probable secondary sinusitis and was complicated by meningitis. The involvement of the cavernous sinus remained unilateral. The patient showed little response to penicillin given intramuscularly and intrathecally and to sulfadiazine taken orally. Intravenous sulfapyridine sodium was substituted for oral sulfadiazine, and the patient showed immediate improvement with ultimate recovery.

The third case was believed to follow a gumma of the nasal septum with secondary infection in a person with uncontrolled diabetes. Treatment consisted of penicillin given intramuscularly and sulfadiazine and "dicumarol" orally. Although the condition became bilateral the patient recovered, but total blindness resulted.

CONCLUSIONS

1. Thrombosis of the cavernous sinus is commoner than is generally supposed.

2. The prognosis is still grave in spite of advances in the use of chemotherapy, anticoagulants and antibiotic agents.

3. The treatment of thrombosis of the cavernous sinus is purely medical, and surgical intervention is only indicated at the site of the origin of the infection to eradicate the focus.

4. The combined use of sulfonamide compounds, antibiotics (penicillin, streptomycin and so forth) and anticoagulants in large doses is strongly advised. If the case is unresponsive to one of the sulfonamide drugs another should be substituted, and the same is probably true of the antibiotic agents.

5. It is our opinion that the early employment of heparin and "dicumarol" administered simultaneously is desirable.

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BACILLARY DYSENTERY AS THE CAUSE OF REITER'S SYNDROME

(Arthritis with Nonspecific Urethritis and Conjunctivitis)

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In December 1916 Reiter[1] in Germany and Fiessinger and Leroy[2] in France independently described the symptom triad of arthritis, conjunctivitis and urethritis. The former ascribed the etiology to a spirochete, the latter to the dysentery bacillus. Perpetuated under the name of Reiter's disease, numerous cases have been described in many articles in the European literature.[3] There are six articles[4] in the American literature, none of which gives serious consideration to dysentery as a cause.

MATERIAL

The study of 176 cases of bacillary dysentery observed in 1943 in Algeria revealed 14 cases of postdysenteric arthritis.[5] Clinical and laboratory summaries of these cases are presented in the accompanying table.

The group includes 1 woman (case 14), 1 Negro man (case 5) and 12 white men. The average age was 27 years. Of these 14 patients, there were only 4 who had arthritis alone (cases 11, 12, 13 and 14). Three patients had only urethritis accompanying the arthritis (cases 8, 9 and 10). Seven patients presented the full triad of arthritis, urethritis and conjunctivitis (cases 1 to 7). In case 2 the patient gave a history decidedly suggestive of conjunctivitis, though no confirmatory observations were available. In all the others objective evidence of the triad was obtained. These 7 instances represent 4 per cent of the total cases of bacillary dysentery and one half of the total cases of postdysenteric arthritis seen in Algeria at this time. There were 5 other cases of possible postdysenteric arthritis, 1 with associated muscular atrophy and peripheral neuritis and 1 with conjunctivitis, but insufficient data are available to justify their inclusion in the present series.

The onset of the arthritis occurred at an average of fifteen days (minimum six, maximum forty-five) after the onset of dysentery. The onset of urethritis occurred at an average of eleven days (minimum four, maximum twenty-five) after the onset of dysentery. Conjunctivitis appeared at an average of twelve days (minimum six, maximum twenty-four) after the onset of the dysentery. It will be seen from the accompanying

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Summary of Clinical and Laboratory Data on Fourteen Cases of Postdysenteric Arthritis

Case; Age; Adm. Date	Dysentery	Arthritis	Conjunctivitis	Urethritis	Blood Agglutination; Stool Culture	Sedimentation Rate (Mm./Hr.) W. B. C.	Comment
1. C. M. 23 yrs. 7/16/43	Diarrhea with chills and fever 10# F. 4 wks. prior to admission, 20 stools daily; duration 6 days	Severe; r. ankle 7/10; l. ankle 7/12; l. knee 7/13; aspirated 7/15; 150 cc. turbid straw fluid with 5 leukocytes per high power field; l. metatarsal joints, hips and l. shoulder subsequently involved	Mod. bilateral; velvety purulent discharge 7/14; duration 8 days; smears neg. for gonococcus	Moderate; mucoid discharge 7/16; meatus pouting; smears neg. for gonococcus; erosion lasted 14 days	S. paradysenteriae Y pos. 1:160; S. sonne (7/23) pos. 1:40; stool culture neg.	7/17 40 7/21 102 7/30 107 7/21 W.B.C. 10,100	Urie acid 3 mg./100 cc. 7/21; electrocardiogram neg. Onset: arthritis 24th day, conjunctivitis 24th day and urethritis 25th day; 7/19 brucellergen skin test neg.
2. R. B. 32 yrs. 7/25/43*	Diarrhea with low grade fever, onset 6/14, duration 7 days; no gastrointestinal symptoms on admission	R. elbow 6/24; l. knee 7/2; r. knee and l. ankle subsequently involved	Smarting of eyes noted by patient 6/20; unobserved	Mild; clear mucoid discharge 6/26; 2 days duration; smear neg. for gonococcus	S. paradysenteriae Y pos. 1:160; S. sonne (6/9) pos. 1:40; stool culture neg.	7/26 80 7/31 76 W.B.C. 9,600	Electrocardiogram neg.; urie acid 3 mg./100 cc.; roentgenogram r. elbow and l. knee neg. Onset: arthritis 10th day, conjunctivitis 6th day and urethritis 10th day
3. H. F. 31 yrs. 7/25/43* 7/12/43†	None though many cases in his group; 1 occasion 3 loose stools	R. knee 7/10; l. knee 7/11; proximal interphalangeal joints, l. 3d toe and r. shoulder	Mild; catarrhal 7/6	Mild; clear mucoid discharge 7/12; burning on urination; 3 to 4 days duration	S. paradysenteriae Y pos. 1:320; B. shigae; S. hirschfeldii, S. schottmülleri neg.; S. sonne pos. 1:40; stool culture neg.	7/26 102 W.B.C. 5,000	Urie acid 2.6 mg./100 cc. Onset: arthritis ?, conjunctivitis ? and urethritis ?
4. P. N. 21 yrs. 6/14/43	Severe diarrhea and fever; in bed 5 days 5/30; recurrence 7 days 6/15; recurrence 3 days 7/1	L. elbow 7/11; later l. ankle, l. knee, r. knee, both hips and wrists; 6½ wks. duration; severe	Keratitis severe with erosion l. eye 7/7; corneal infiltration; smears neg. for gonococci; occasional gram-pos. diplococci and gram-pos. and neg. rods; 6 wks. duration	Dysuria and urethral discharge 7/8; smear neg. for gonococci repeatedly; "pleomorphic gram-pos. organisms"; urine neg.; meatus showed superficial ulceration	S. sonne neg. 6/17; S. paradysenteriae Y pos. 1:320; stool culture neg.	8/15 100 8/16 105	Onset: arthritis 11th day, conjunctivitis 7th day and urethritis 6th day
5. A. M. 24 yrs. Negro 5/29/43	Diarrhea, cramping; fever 10# F.; onset 5/27; 3 days duration	L. metatarsal joint; swelling and severe tenderness 6/15	Acute, purulent conjunctivitis 6/16; no gram-neg. diplococci but numerous gram-neg. bacilli; culture neg.	Purulent discharge 6/16; smears repeatedly neg. for gonococci; numerous gram-neg. bacilli; culture neg.	Stool pos. 6/2 for cysts of E. histolytica and course of emetine and carbarsone given; clinical course that of bacillary dysentery; no aggl. done; stool culture neg. 6/19	96 W.B.C. normal	Onset: arthritis 19th day, conjunctivitis 20th day and urethritis 14th day
6. B. C. 26 yrs. 8/23/43* 6/31/43†	Mild diarrhea (3 stools daily) 9/23 to 9/26	R. ankle swollen and hot 6/31; still painful 9/23	Mild 6/31	Cream white discharge 6/31; smear and culture neg. for gonococci; prostatic fluid neg.	S. paradysenteriae Y neg.; stool culture neg.	?	Onset: arthritis 8th day, conjunctivitis 8th day and urethritis 8th day
7. E. H. 27 yrs. 10/29/43	Mild diarrhea (3 stools daily) 9/23 to 9/26	L. 1st metatarsal 10/4; l. knee 10/5; aspirated 160 cc. sterile, yellow mucoid fluid 10/9; r. knee 10/14; r. wrist; little improvement after 3 wks.	Slight sticky discharge 10/6 to 10/10	Grayish discharge 10/5 to 10/16	S. paradysenteriae Y pos. 1:80; stool culture neg.	10/4 96 W.B.C. 13,300	Onset: arthritis 10th day, conjunctivitis 12th day and urethritis 11th day; roentgenogram of l. knee neg.
8. G. A. 34 yrs. 7/16/43	Acute dysentery 6/19 to 6/25; hospitalized	L. knee 6/27; l. shoulder and elbow; severe swelling of the knee; minimal improvement after 35 days	None	Mild, sticky secretion over meatus 7/4; dysuria 4 days duration; urine neg.	Aggl. 7/26; B. shigae pos. 1:320; S. paradysenteriae Y pos. 1:640; S. sonne pos. 1:320; stool culture pos.	7/25 95 W.B.C. 7,750	Urie acid 3.4 mg./100 cc. 7/18 Onset: arthritis 8th day, conjunctivitis none and urethritis 15th day; brucellergen skin test neg.
9. S. C. 39 yrs. 6/21/43* 6/7/43†	Acute dysentery 4 days, May 1943	L. knee 6/15; aspirated yellowish fluid; knee still tender and swollen on admission to hospital; interphalangeal joints of 1st and 3d toes l. foot and all on r. foot	None	Dysuria and cloudy urine 7 days; 2 to 3 days after diarrhea	S. sonne pos. 1:400; S. paradysenteriae Y pos. 1:160; B. shigae neg.	6/21 72 W.B.C. 6,400	Roentgenogram of knee showing "atrophy of disuse" Onset: arthritis 45th day, conjunctivitis none and urethritis 7th day
10. R. S. 25 yrs. 6/7/43	Severe diarrhea, onset 5/24; associated with abdominal cramps and chills of 4 days duration	R. knee 6/2; l. knee 6/4; pronounced hydrops; 150 cc. straw colored fluid, sterile; neg. aggl. studies to Shigella; l. ankle 6/13; pain and tenderness to motion; severe; mod. improvement in 1½ mos.	None	Burning on urination 5/29; few pus cells; moderate urethral discharge	B. shigae neg.; stool culture neg.	6/15 105	Roentgenograms of knees neg. Onset: arthritis 13th day, conjunctivitis none and urethritis 4th day
11. J. C. 27 yrs. 7/15/43	Acute diarrhea 3 days 7/1	Pain, tenderness and swelling of tarsal joints 7/9	None	None	S. paradysenteriae Y neg.; stool culture (7/24) pos. S. paradysenteriae	7/15 80 W.B.C. 16,200	Onset: arthritis 8th day, conjunctivitis none and urethritis none
12. A. A. 27 yrs. 6/28/43	Severe diarrhea with blood; chills and fever 10 days (onset 5/29)	L. hip 6/14; l. knee, l. and r. ankle, l. and r. shoulder	None	None	S. paradysenteriae Y pos. 1:160; S. sonne pos. 1:160	7/2 38	Roentgenogram l. hip neg. Onset: arthritis 16th day; brucellergen skin test neg.
13. C. H. 48 yrs. 6/19/43	Dysentery with fever 5/28	Fluid, pain in l. elbow; both knees and shoulder 6/19	None	None	Stool culture pos. for S. paradysenteriae	.....	Urie acid 3.9 mg./100 cc.; peculiar skin lesions on legs; electrocardiogram low voltage on all leads Onset: arthritis 13th day
14. F. T. 24 yrs. Woman 11/7/43	Severe diarrhea with fever 7/27; exacerbation of diarrhea 9/1	Toes, distal and proximal interphalangeal joints; knees 9/16; ankles	.....	.....	Flexner H, pos. 1:80	Convalescent when seen in hospital	Onset: arthritis 23d day

table that the order of occurrence of the symptoms is variable.

One patient (case 3) experienced only a few loose stools. In 10 cases (1, 2, 5 to 11, 13) the dysentery was classified as mild to moderately severe, and in 3 cases (4, 12 and 14) it was considered severe. The grading of the severity of the dysentery was necessarily subject to large error, but it was our impression that there was little, if any, correlation between the severity of the dysentery and the severity of the complications. Indeed, some of the patients having the severest complications gave a history of mild or only moderately severe dysentery.

The arthritis was polyarticular in all but 2 instances (cases 5 and 6). The average number of joints involved was four. The joints involved, with the frequency of involvement, were as follows: shoulders four, wrists two, left knee three, both knees eight, ankles eleven, hips three, tarsals seven, left elbow three, right elbow one. In the cases of involvement of the knee there was frequently considerable fluid distending the joints. Aspiration was carried out in three cases (1, 7 and 10), and turbid, viscous, yellow fluid was obtained. The fluid in each instance was sterile and in 1 case (10) failed to agglutinate Bacterium shigae antigen (the only antigen available at the time). In this case the blood serum also failed to agglutinate B. shigae antigen.

The conjunctivitis was usually mild. This should be emphasized, for it is easy for both the physician and the patient to overlook it. In case 4, however, a severe keratoconjunctivitis occurred. Repeated examinations of the conjunctival discharges were negative for the gonococcus.

The urethritis was also mild in most of the cases. There were superficial erosions about the urethral meatus in 2 cases (1 and 4). Here again repeated bacteriologic examinations of the discharge were negative for the gonococcus. In 1 instance (case 4) pleomorphic gram-positive organisms were noted.

Stool cultures were positive in 3 cases (8, 11 and 13), negative in 8 and not carried out in 3. Blood agglutination tests were performed in 12 of the 14 cases (omitted in cases 5 and 13). Negative results were obtained in 3 cases (6, 10 and 11). In 2 cases (7 and 14) the tests were positive in titers of only 1:80. In the remainder the tests were positive to one or more strains in titers of 1:160 or higher. The strains involved were as follows: Shigella paradysenteriae Y, 7; Shigella Sonne, 2, and B. shigae, 1. Three cases showed significant positive results to tests with multiple strains.

The sedimentation rate in all cases was decidedly increased, frequently reaching values above 100 mm. per hour by the Westergren method. The white blood cell counts were elevated above 10,000 in only 2 cases (case 7, 13,500; case 11, 16,200).

Roentgen examination of various joints in several of the cases revealed no evidence of articular destruction. Brucellergen skin tests, electrocardiograms and determination of the uric acid content of the blood were also negative or within normal limits.

The course of the arthritis proved to be prolonged, and circumstances required the evacuation of the patients to the United States before we had an opportunity to observe the final outcome. Recurrences over an eight year period have been reported.[5b] Treatment was essentially symptomatic. Large doses of salicylates failed to give adequate relief, and opiates were necessary during the severest phase of the illness. Sulfonamide therapy was without effect. The conjunctivitis and urethritis were usually of brief duration, and in no case were they serious problems.

COMMENT

It is well established that arthritis may be an occasional complication of bacillary dysentery.[6] Noteworthy articles on dysenteric arthritis are those of Graham,[7] Stettner [8] and Klein.[9] The pathogenesis of the arthritic condition is not completely understood. Most observers look on it as an allergic reaction of the articular mucosa to dysenteric toxins.[10] Freiberg [11] has shown that an experimental arthritis simulating the proliferative arthritis of man may be produced in rabbits by the repeated injections of a bacterial extract of S. paradysenteriae Y. He concluded that the dysenteric arthritis of man may be a local allergic manifestation of a bacterial infection in the intestinal tract.

Dysenteric conjunctivitis is also well established as a clinical entity.[12] Voissius, in 1904,[13] in reporting a case of conjunctivitis and iridocyclitis following acute bacillary dysentery, gave an excellent and complete description which covers entirely the syndrome of conjunctivitis, arthritis and urethritis later reported by Reiter. It is of interest that a positive blood agglutination (1:320) for B. shigae was obtained. The reviews of Toulant and Sarrouy [14] and of Kiep [15] are particularly complete. In Reiter's original report [1] it is to be noted that the first entry on the clinical history is that the patient had a "diarrhea with a blood admixture" and that it was eight days later that the urethritis, conjunctivitis and arthritis appeared. No authors have been able to duplicate Reiter's observations in regard to a "spirochete forans." The contemporary (1916) report of Fiessinger and Leroy [2] described the complete symptom triad of Reiter in a discussion of the complications of an epidemic of bacillary dysentery in Somme, France. These authors [2] were the first to use the name conjunctivo-urethro-synovial syndrome.

The tendency in the European literature has been to doubt whether Reiter's disease is a distinct etiologic entity. Schittenhelm and Schlecht [16] and Kruspe,[17] Cimbal [18] and Beiglböck [19] consider Reiter's disease or syndrome secondary to an infection in the intestinal

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16. Schittenhelm, A., and Schlecht, H.: Ueber Polyarthritis enterica, Deutsches Arch. f. klin. Med. **131**: 329-369 (June) 1918.

17. Kruspe, H.: Zur Aetiologie der Reiterschen Erkrankung, Dermat. Wchnschr. **112**: 457-464 (June) 1941.

18. Cimbal, O.: Das Reitersche Syndrom als Nachkrankheit der Ruhr, Arch. f. Ophth. **145**: 142-162 (Aug.) 1942.

19. Beiglböck, W.: Zur Behandlung der Reiterschen Krankheit (Ruhr-Rheumatismus), Deutsche med. Wchnschr. **69**: 803-805 (Nov. 26) 1943.

tract. P. Manson-Bahr [20] commented in discussing Beiglböck's work that "Reiter's disease appears to be nothing else than the familiar dysenteric polyarthritis with some superadded toxic manifestations which have been previously described."

The first report in the American literature was made in 1942 by Bauer and Engleman.[4a] Since that time there have been several other reports.[21] The literature has been completely covered in the reviews of Vallee [5b] and of Lever and Crawford.[5a] The possibility that Reiter's disease might be a complication of an intestinal infection has not been stressed by any American authors.

It seems probable that the symptom triad of Reiter's disease and the "uretero-conjunctivo-synovial syndrome" of Fiessinger and Leroy are the same disease entity. Conjunctivitis and urethritis have often been noted in patients whose disease has been diagnosed as dysenteric arthritis. Our cases 1 to 7 fulfil the clinical requirements of both authors. All 7 patients gave a history of dysentery or diarrhea. Significantly positive agglutination titers for Shigella organisms were obtained in 4 of the 6 cases in which the blood was tested.

CONCLUSION

Reiter's disease in our opinion is a particular combination of three of the recognized complications of bacillary dysentery—arthritis, urethritis and conjunctivitis.

CLINICAL AND PATHOLOGIC STUDIES IN SPRUE

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This report is concerned with clinical and pathologic observations in a group of 40 patients manifesting the sprue syndrome. These patients were observed at the Mount Sinai Hospital during the past fifteen years.

The central point of this symptom complex is an impairment in the absorption of fat, fat-soluble vitamins and some carbohydrates. As a result, there then may appear steatorrhea; weight loss of considerable degree; an anemia, usually of a hyperchromic macrocytic variety, and painful lesions of the mouth and tongue. Hypocalcemia with tetany and osteoporosis, pigmentation of the skin, hypoproteinemia, polyvalent deficiencies in vitamins, minerals and amino acids, as well as signs of hepatic damage are not infrequently seen.[1]

Of the 40 patients studied, the disease of 36 is designated as "primary sprue," that is, there were no roentgenologic or other evidences of organic changes in the intestinal tract that could account for the syndrome on clinical grounds. In 6 of the 36 patients, postmortem examinations confirmed the absence of gross systemic disease, although alterations were found in the intestinal canal and the mesenteric glands that were considered of interest. In addition 2 other patients died, 1 elsewhere and 1 at this hospital, where permission for autopsy could not be obtained. In 4 others gross pathologic alterations were encountered at necropsy which could be held responsible for the sprue syndrome. This group will be designated as "secondary sprue."

In an effort to see whether patients with the obvious gross changes in the intestinal tract differed in any way from those whose disease was designated as primary sprue, the two groups were separated, and their clinical courses were analyzed and compared.

PRIMARY SPRUE

General Characteristics.—The group with primary sprue comprised 36 patients, 13 men and 23 women (table 1). Of these, 15 were Latin Americans and the rest were first generation Americans of Central and Eastern European extraction. Eighteen were Jewish, 14 Puerto Rican, 1 Cuban, 2 American of Irish extraction and 1 Swedish. The preponderance of Jews and Puerto Ricans in this clinical material can in no way be considered as statistically significant, because this hospital population draws in large part on such groups. The age of the patients ranged from 16 to 73 years, the average being 41. There was only 1 patient each at the extreme ends of the scale.

In view of the differentiation between tropical and nontropical sprue that has been made by many workers in the field, it became of interest to ascertain whether the illness had its inception in the tropical or temperate zones. In this series 7 of the patients contracted their illness either while in the tropics of the Western or Eastern hemisphere, while 29 acquired the disease under our climatic conditions. There were many patients in the latter group who had migrated to the temperate zone, but in whom sprue had developed only after many years' residence here.

Observations of these patients were made over the course of one month to twelve years. The average period was 3.6 years.

Hematologic Observations.—The abnormalities of the hemogram are an essential part of the sprue syndrome (table 2). The hemoglobin values in our patients ranged from 14 to 100 per cent, the average being 62 per cent. Four patients who had a hemoglobin level of 35 per cent or less had bleeding in some form as a prominent feature (cases 7, 9, 20 and 35). The red blood cell counts varied between 0.8 to 5.5 million, the average being 3.0. The two lowest values (0.2 and 0.75) were again found in patients who had bleeding phenomena (cases 7 and 9).

In 19 patients the color index was over 1; in 12 it was 1; in 4 it was less than 1. In the last group bleeding was again a prominent symptom. It may be said, therefore, that 54.3 per cent of the patients manifested a hyperchromic, 34.4 per cent a normochromic and 11.4 per cent a hypochromic type of anemia. Macrocytosis was regularly associated with the hyperchromic and not infrequently with the normochromic group.

The white blood cell counts ranged from 1,950 to 13,900, the average being 6,712. Eight of the patients had 5,000 cells or less, and 6 had 10,000 or more. In 3 of the latter there were febrile rises of undetermined etiology.

In 14 patients the thrombocytes were examined. It was of interest that in as many as 6 they were below 100,000, but in only 1 were there clinical manifestations of bleeding (case 7). In 4 of these 6 patients the icterus index was elevated, and in 3 instances there was evidence of enlargement of the liver and/or spleen.

Examination of the bone marrow was made in 12 instances; in 5 the cells had an erythroblastic character of moderate to pronounced intensity, and in 4 there was a megaloblastosis of

20. Beiglböck,[1a] abstracted by P. Manson-Bahr, Trop. Dis. Bull. 41: 571-872 (July) 1944.
21. Colby,[4c] Rosenblum,[4c] Twiss and Douglas,[4d] Lever and Crawford,[5a] Vallee.[5b]

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Because of limitation of available space this article is abbreviated in THE JOURNAL by omission of the illustrations, tables 1, 2, 3, 4 and 6, and considerable portions of the text. The complete article will appear in the authors' reprints.

similar quality. Two examinations revealed normal conditions in patients in a period of remission. In the other patients, without exception, examinations of the bone marrow were made during the active stage of the disease. In 1 case there was a moderately fatty marrow in a patient near death and with extreme cachexia.

Stool Findings.—Steatorrhea has been generally accepted as the *conditio sine qua non* of sprue. By this we mean an elevation of the fat in the stool over the upper limit found in normal persons under conditions of the average mixed diet, that is, 15 to 25 per cent of the dried material. In sprue, stool fat-partition reveals only small amounts of neutral fat and large amounts of fatty acids and soaps.

As a rule the feces were bulky, frothy and liquid to semisolid in consistency (table 3). Diarrhea was present almost always. It is our experience that the characteristic sprue stool is not foul-smelling in contrast to that of known inflammatory disease, such as ulcerative colitis and regional ileitis, but rather is rancid in odor. In all the patients but 1 repeated examinations failed to reveal the presence of pathogenic bacteria, ova

TABLE 5.—*Comparative Data*

	Primary Sprue	Secondary Sprue
Number of cases	36	4
Age range	16 to 73	33 to 55
Age average	41	44
Duration of symptoms prior to hospitalization (mos.)	80	4.75
Burning of mouth and tongue	Very frequent	Rare
Soreness and reddening	Frequent	Absent
Clubbing of fingers	Occasional	Occasional
Hemoglobin, percentage	62	74
Red blood cell count (millions)	2.0	3.9
Color index	In 80% 1 or >1	Usually <1
White blood cell count	6,712	10,585
Bone marrow	Erythroblastic or megaloblastic arrest	Normal
Gastric acidity	80% present	Present
Stool findings	Steatorrhea (fatty acids and soaps)	Steatorrhea (fatty acids and soaps)
Serum proteins, Gm./100 cc.	5.8	5.85
Serum calcium, mg./100 cc.	8.1	8.4
Serum phosphorus, mg./100 cc.	3.4	5.1
Phosphatase (alkaline), King-Armstrong units	17.9	?
Dextrose tolerance test—oral	Flat	Flat
Dextrose tolerance test—intravenous	Normal	Normal
Vitamin A blood level	Low	Low
Vitamin A tolerance test	Flat	Flat
Carotene blood levels	Low	Low
Pancreatic enzymes	Present	Present
Liver function	May be impaired	Normal (?)
Therapeutic response		
Hematologic	0 to 4+	No response
Function of bowels	0 to 4+	No response
General	0 to 4+	No response
Roentgenologic observations	Deficiency pattern	Deficiency pattern

or parasites in the stool. In 1 patient, a Puerto Rican (case 28), Strongyloides stercoralis was found.

However, there do exist patients presenting the typical sprue syndrome who have only one or two formed bowel movements a day, even at the height of their disease. These stools may nevertheless have a high fat content, as in cases 15 (32.5 per cent) and 23 (46 per cent).

In 18 instances the total fat content in percentage of dried weight averaged 38 per cent. In 4 other patients an analysis of the fat, made while the patient was on a fat-restricted diet revealed an average of 14.7 per cent. The great difference in these two values emphasizes the importance of the fat content in the diet at the time when the determinations are performed. Such low figures do not impair the validity of the diagnosis of steatorrhea under conditions of greatly limited fat intake.

The 4 patients (cases 11, 15, 23 and 24) who had formed stools at the onset showed some clinical features in common. All 4 undoubtedly had sprue. With 1 exception (case 24) hydrochloric acid was present in the stomach. Two patients (cases 11 and 14) had hemorrhagic manifestations, while in the remaining 2 thrombopenia was present (cases 25 and 23), in the former with jaundice. The significance of these observations, which may be purely coincidental, cannot be evaluated at the present writing.

Characteristically, the stool of sprue is free of blood, both gross and occult. This was borne out in all except 5 instances, in 4 of which there were severe manifestations of the hemorrhagic diathesis. The fifth patient (case 2) died with renal failure (azotemia).

Chemical Studies.—The chemical studies included determination of total serum proteins, the albumin-globulin ratio, the calcium, phosphorus and phosphatase content, as well as the pancreatic enzymes in the duodenal contents. Dextrose tolerance tests were performed orally and intravenously. Fat or vitamin A tolerance tests were performed in the standard way. To evaluate the function of the liver, icterus index, total and esterified cholesterol, the prothrombin time and in a few instances hippuric acid synthesis, galactose tolerance and cephalin flocculation tests were done.

Vitamin A and Fat Tolerance Test.—In 17 patients the ability to absorb fat and/or fat-soluble vitamins was tested using cream and vitamin A, respectively (table 4). In 2 (cases 22 and 24) the absorption of the fat was decidedly impaired, the fasting and postprandial level of the total serum lipids being almost identical. Similar observations were made with vitamin A in 15 patients. In 12, during the active stages of the disease the fasting vitamin A level ranged between 15 and 63 micrograms, the average being 35 micrograms per hundred cubic centimeters. This represented a reduction of about 50 per cent when compared with that found in the average hospital population. The maximum elevation of the vitamin A serum content four hours after the administration of 180,000 international units varied between 28 and 85 micrograms, the average being 44.3 micrograms per hundred cubic centimeters.

Therefore, the disturbance in vitamin A metabolism in sprue is characterized by low fasting figures and lack of elevation in the postabsorptive phase.[3] A similar situation exists with regard to the carotene levels of the serum. The values are extremely low during the phases of the active disease. Even during remission the disturbed pattern in vitamin A and carotene metabolism may persist, although in a modified form. Three patients (cases 9, 16 and 23) examined at such a time showed average fasting levels of 61.6 micrograms per hundred cubic centimeters, with a postprandial elevation averaging 80 micrograms. In other instances in which it was possible to make serial studies during the period of observation slight improvement or none at all was observed. Although the fasting values rose considerably in 3 patients (cases 33, 35 and 36) there was no improvement noted in their absorptive capacity. However, patient 31 failed to show a change of the fasting or postabsorptive levels. This is all the more remarkable in the face of the improvement in the general condition, the diarrhea and the hematic picture. Any analogy may be drawn, possibly, between this observation, the persistent steatorrhea and the maintained roentgenologic abnormalities of the small bowel seen in some patients during periods of remission.

Response to Therapy.—It is well established that sprue is amenable to specific therapy. This consisted in these patients of a high protein and low fat diet with moderate amounts of carbohydrates, preferably in the form of monosaccharides. The diet was supplemented by large amounts of vitamins, especially of the B complex, parenteral extract of liver and, of late, folic acid.[4]

A classification based on a 1 plus to 4 plus change in the reticulocytes, hemoglobin and red blood cells disclosed that 6 patients had a 4 plus response, 14 a 3 plus response and 9 a 1 plus response to therapy. One patient died of undetermined cause with no response at all (case 2). In addition, it must be stated that fatalities occurred even in those patients with good original responses of 1 to 3 plus.

3. Adlersberg, D., and Sebotka, H.: Fat and Vitamin A Absorption in Sprue and Jejunoileitis, Gastroenterology 1:357, 1943. Adlersberg, D.: Fat and Vitamin A Absorption in Sprue, New York State J. Med. 44:606, 1944.

In the clinical course of the successfully treated patients there was a remarkable improvement in bowel function with a subsidence of diarrheal movements concomitant with improvement of the general condition and the hematic picture. Analyses of the stool revealed likewise a diminished fat content in some instances, for example, cases 4 (47 to 27 per cent), 5 (40 to 13 per cent) and 22 (55 to 25 per cent), while in others the fat content of the formed infrequent "normal" stool may remain high, e. g., case 36 (55 to 34 per cent). These latter instances may thus resemble conditions in a group of sprue patients who never consult the physician with a complaint of diarrhea.

A similar classification on a 1 plus to 4 plus basis with regard to the amelioration of the bowel function disclosed that 27 of the 36 patients had an improvement of 2 to 4 plus. In all of them the frequency of diarrhea diminished considerably, and in those with a 4 plus response a formed stool was achieved; but even in the latter bowel disturbances frequently could not be avoided when the intake of fat was increased. There were 4 patients in the group having sprue without diarrhea (cases 11, 15, 23 and 24), so that one could not anticipate any change in them. Four patients (cases 32, 33, 35 and 40), of which 1 (case 40) was treated with folic acid, failed to show improvement in this regard. In this group 3 patients represented the therapy-resistant type of sprue, since they did not respond well in any respect, while 1 did show hematologic progress after liver therapy and blood transfusions. In 1 patient who died no adequate observations were available.

Although the initial hematologic response was relatively not so striking as the coprologic response, nevertheless in long range terms of return to normalcy, the elevation of the blood count superseded the intestinal improvement. This was so because a 4 plus stool response still carried with it the ever present tendency to looseness of the bowels under certain circumstances, such as emotional stress, intercurrent infection and high fat content of the diet.

As far as the effect on the roentgenologic findings was concerned, it was found that in the course of successful therapy the disturbed motility as well as the deficiency pattern of the small intestine may revert to normal or at least improve considerably. Nevertheless, no set rule can be laid down, since in other instances an abnormal pattern may persist despite improvement in the general condition and the bowel function of the patient.

Taken all in all, including gain in weight, sense of well-being, and alleviation of glossitis, 27 patients showed a remarkable response to specific therapy, 6 a moderate improvement and 3 none at all. This entire group included 8 fatalities, in some of whom the early response to therapy was favorable. Of these, 6 came to necropsy.

SECONDARY SPRUE

In this series there were 4 patients (cases 14, 21, 28 and 34) with secondary sprue, of whom 2 were men and 2 women. Only 1 was a Latin American (Puerto Rican); 2 were Jewish of Central European extraction and 1 was American of Irish origin. Their ages ranged from 33 to 55 and averaged 44.

The duration of symptoms prior to the need for hospitalization ranged from three to six months, averaging 4.75 months (table 1). As in primary sprue, these patients were underweight, the average being 104 pounds (47 Kg.) weight on admission and 102 pounds (46 Kg.) on discharge. The net loss of weight was 2 pounds (1 Kg.). With the exception of 1 patient (case 14), who gained 5 pounds (2.3 Kg.) transiently, all lost weight.

Atrophy of the tongue was encountered 3 times, cheilosis twice in this group. Burning of the mouth was present only once. Striking soreness of the mouth with fiery reddening was not observed. In only 1 of these patients (case 21) was unequivocal pigmentation of the skin present. Clubbing of the fingers was observed in only 1 patient (case 14), and this was of a mild degree.

Hematologic Data.—The hemoglobin ranged from 60 to 95 per cent, the average being 74 per cent (table 2). The red blood cell count varied from 3.4 to 4.4 million, the average being 3.9 million. An analysis of the color indexes disclosed that 1 patient was normochromic and 3 were hypochromic. In none of these patients was macrocytosis present. The white blood cell count ranged from 6,500 to 12,700 and averaged 10,500. Febrile rises were present in 2 patients (cases 21 and 28). No observations on blood platelets were made. No bleeding phenomena were observed in any of the patients of this group. The bone marrow was normal in 3 instances and hypoplastic in 1.

Stool.—All 4 patients had light colored, fatty, foamy, bulky stools whose consistency varied from a liquid to a semisolid state. They were indistinguishable from the stools of sprue in every respect. In only 1 instance (case 14) was quantitative analysis for total fat made, and this proved to be 47 per cent of the dried weight. In 3 of the 4 patients occult blood was found regularly (table 3).

Roentgenologic Observations.—In all these cases roentgenologic study revealed abnormalities of the small intestine resembling the deficiency pattern seen in sprue. In patient 14 there was in addition a type of serration of the small intestinal loops which did not exclude the diagnostic possibility of an ulcerative process.

Response to Therapy.—The response to therapy in these patients, of whom only 3 received liver parenterally, was uniformly poor. Indeed, all 4 of them died. In only 1 patient (case 34) was there improvement in the quality of the stools, but only transient amelioration of the blood picture.

POSTMORTEM FINDINGS

Of the 12 patients who eventually died of sprue, 10 came to necropsy. Of these, 6 had primary sprue (cases 1, 7, 29, 30, 31 and 35) and 4 (cases 14, 21, 28 and 34) had secondary sprue. The essential clinical data of the 10 patients are available in tables 1, 2, 3, 4 and 6, the pathologic findings are summarized in table 7.

PRIMARY SPRUE

Of the 6 patients with primary sprue, patient 1 died after an appendectomy for acute appendicitis and patient 31, twenty-five days after resection of the sigmoid colon for volvulus, with subsequent purulent pyelonephritis. Patient 35 succumbed with great rapidity to an acute necrotizing laryngotracheitis, from which an atypical type B influenza virus was recovered. Patients 7 and 29 died of a tetanic and hemorrhagic syndrome, associated in the latter with necrosis of the liver. Patient 30 died of a progressive cachexia terminating in marantic thromboses of the dural sinuses and cerebral veins.

Small Intestine.—Although the small intestine was grossly described as being normal in patient 1, unfortunately no record of histologic examination or tissue for restudy could be obtained. Patient 7 showed, as the most striking abnormality, large amounts of a granular pigment identified as hemofuscin (fig. 1). This was found only within the sarcoplasm of the cells comprising the muscularis propria and was present in greater amounts proximally than distally. Similar findings, but to such a degree that it could be appreciated grossly as a brownish

discoloration of the muscularis, were present in patient 31 (fig. 2). In this instance there was likewise a considerable paucity and separation of the cells of the muscular tunic.

The small intestine of patient 30 presented nothing grossly or microscopically of significance pertaining to the sprue syndrome from which she had suffered for many years. Two small and deformities of the villus such as clubbing were found in all portions of the small intestine (fig. 3). These lesions have received detailed study elsewhere [5] by one of us (J. S.). Except for an increase over the expected number of leukocytes in the lamina propria and occasional bizarre villus shapes, no morphologic abnormalities were encountered in patient 35.

TABLE 7.—*Summary of*

Case	Stomach	Small Intestine	Large Intestine	Mesenteric Lymph Node	Pancreas	Liver
Primary sprue						
1	Gross: atrophy	Normal	Normal	Normal	Normal	1,920 Gm.
	Micro.: atrophy	No info.	Normal	No info.	Normal	Centrolobular fibrosis; fat moderate
7	Gross: flat, pale	Congestion	Congestion	Enlarged	Normal	1,240 Gm.
	Micro.: within normal limits	Marked hemofuscinosis of muscularis propria	Mild hemofuscinosis	Within normal limits	Interlobular fibrosis, moderate	Congestion
29	Gross: normal	Normal, "velvety mucosa"	Normal	Enlarged	Normal	1,100 Gm.
	Micro.: slight atrophy of pyloric mucosa	Villus clubbing with hyaline villus bands	Much mucus	Chronic lymphadenitis *	Some acinar atrophy	"Acute yellow atrophy"
30	Gross: atrophy	Normal	Normal	Normal	Enlarged	2,080 Gm.
	Micro.: autolysis, small myoma	Normal except for ? serosal chondromas and some fibrous adhesions	Normal	Normal	Fine fibrosis	Extreme steatosis
31	Gross: massive dilatation	Massive dilatation; brownish pigmentation of the muscularis	Normal except for brownish pigmentation of the muscularis	Enlarged	Normal	1,875 Gm.
	Micro.: hemofuscin in muscle	Hemofuscinosis of the muscularis propria; atrophy of the muscularis	Hemofuscinosis of the muscularis propria	Unusual, disproportionate trabeculation	Severe interlobular and intralobular fibrosis	Congestion
35	Gross: normal	Normal	Normal	Enlarged	Normal	1,580 Gm.
	Micro.: normal	Increased leukocytes in lamina propria; occasional bizarre villus shapes	Endometriosis, focal	Unusual, disproportionate trabeculation	Intralobular fibrosis	Normal
Secondary sprue						
14	Gross: ulcerated lymphosarcoma	Lymphosa; involvement with jejunojejunal and multiple ileal fistulas; entire thickness of bowel involved	Normal	Enlarged nodes (tumor)	Normal	1,440 Gm.
	Micro.: lymphosa; with ulceration	.....	Normal	Enlarged nodes; pigment	Normal	Congestion; tumor
21	Gross: normal	Normal	Normal	Normal	Some fat necrosis	2,080 Gm.
	Micro.: amyloid, with some adjacent round cell foci	Extensive amyloid deposition in stratum propriun, basement membrane and vessels of submucosa	Small infrequent foci of acute proctocolitis	Foci of acute lymphadenitis	Moderate interlobular fibrosis	Extensive amyloid deposition with liver cell atrophy
28	Gross: normal	Normal	One ulceration	Enlarged, firm	Normal	1,340 Gm.; atrophy
	Micro.: normal	Villus and submucosal collection of lipoid-containing macrophages	Normal otherwise	Granulomatous giant cell reaction with lipoid-containing macrophages	Normal	Miliary tuberculosis
34	Gross: diffuse congestion	Smooth, pale mucosa with thin wall	Severe congestion, some erosions	Atrophy	Normal	1,480 Gm. (enlarged for this patient)
	Micro.: normal	Amyloid deposition in stratum propriun and vessels	Normal	Atrophy	Slight diffuse fibrosis	Focal congestion

* This diagnosis was made on a node biopsied during an exploratory laparotomy three months after the onset of illness.

chondromas of the proximal jejunum were found and a few nonconspicuous fibrous adhesions which stemmed most probably from the previous operation. In both patients 29 and 35 the small intestine appeared normal grossly, although in the former the examination with a hand lens revealed scattered foci where the mucosal surfaces appeared more velvety than normal. On microscopic study remarkable lesions consisting of hyaline bands

Mesenteric Lymph Nodes.—The mesenteric lymph nodes which lie astride the absorption pathways of the small intestine deserve careful consideration in any case of malabsorption. No information was available in patient 1, although there were presumably no gross changes. Patients 7 and 30 revealed no significant findings in contrast to patients 29, 31 and 35 in whom the nodes were enlarged to at least twice the normal size. A

mild chronic lymphadenitis was present in patient 29. The nodes in both patients 21 (fig. 4) and 35 (fig. 5) were characterized by an unusual broad fibrous trabeculation, whose counterpart was not seen in sections of our control group of 40 other mesenteric lymph nodes from cases of all types (fig. 6).

Spleen.—A splenomegaly of mild degree was present in patients 1 and 35 (490 and 300 Gm., respectively). In the former there were associated congestive hepatic changes and terminal infection. In the latter the morphologic alterations could be ascribed to the old operative intervention for a left subdiaphragmatic abscess and to the fulminating respiratory infection at the end.

Findings at Necropsy

Spleen	Bone Marrow	Adrenals	Parathyroid	Skin	Comment
490 Gm.	Spongy, red	Normal	No info.	No info.	Cause of death: appendicitis
Hyperemia; fibrosis; "acute splenitis"	Erythroid hyperplasia	Normal			
150 Gm. (enlarged)	Spongy, red	Normal	Normal	Normal	Cause of death: multiple hemorrhages
Hyperemia; lining endothelial hyperplasia	Decided erythroid hyperplasia	Normal	Normal	Iron free pigmentation, basal layer	Deformed dwarf
210 Gm.	Spongy, red	Normal	Normal	Pigmentation; follicular hyperkeratosis	Cause of death: liver necrosis and multiple hemorrhages
"Acute splenitis"	Increased fat, paucity of megakaryocytes; erythroid activity good	Normal	Congestion and hemorrhages	Melanin	
75 Gm.	Normal	Normal	Normal	Normal	Cause of death: marantic thrombosis of dural sinus and cerebral veins
Fibrosis; hemosiderosis	Increased fat with pronounced erythroid activity	Normal	Conspicuous connective tissue proliferation	.....	General atrophy of viscera except liver and pancreas
190 Gm.	Spongy, red	Autolysis	Normal	Pigmentation	Cause of death: volvulus of the sigmoid with resection; and acute purulent pyelonephritis
"Acute splenitis"	Active myeloid and erythroid series	Autolysis	.....	Melanin; hemosiderosis, slight	Hemofuseinosis; old "neurodermatitis" and brawny edema of the legs
300 Gm.	Spongy, red	Normal	Normal	Normal	Cause of death: acute necrotizing laryngotracheitis (influenza virus B)
Fibrosis and "acute splenitis"	Increased fat; increased erythroid activity	Autolysis	Normal	.....	Status 1 yr. after drainage of left subphrenic abscess
175 Gm.	Spongy, red	Normal	No info.	No info.	Cause of death: intestinal obstruction
Congestion	Active in all series	Reticularis heavily pigmented	.....	.....	Abdominal lymphosarcomatosis; chronic adhesive peritonitis; general pigmentation, not intestinal; pigmentation in lymph nodes, testes and seminal vesicles
250 Gm.	Spongy, red	Normal	No info.	Diffuse pronounced pigmentation	Cause of death: hypernephroma
Extensive amyloid deposition	Normal except for amyloid	Amyloid deposition	.....	Melanin in basal layers	Generalized amyloidosis; azotemia; biliary calculus
120 Gm.	Negative	Lipoid-poor	Normal	No info.	Cause of death: disseminated tuberculosis
Miliary tuberculosis hemosiderosis	General hypoplasia	Fresh tubercle; fat atrophy	.....	.....	Intestinal lipodystrophy (Whipple's disease)
Surgically removed 14 yrs. before	Spongy, red	Lipoid-poor	Normal	Pigmentation (focal)	Cause of death: Hodgkin's disease
.....	Normal; active erythroid series	Normal	Normal	Melanin	Amyloidosis of heart and small intestines; status 8 yrs. after radio therapy; biliary calculi

Liver.—Although patient 1 had a hepatomegaly (1,920 Gm.) with fatty changes and a centrolobular fibrosis of moderate degree and patient 31 a slight hepatic enlargement (1,875 Gm.) due principally to congestion, these alterations were not nearly so striking as those observed in patients 29 and 30. The former had a severe necrosis of the liver and the latter a steatosis of such a degree that liver parenchyma was not visible in many of the fields. Patients 7 and 35 had no anatomic abnormalities.

The 150 Gm. spleen of patient 7, a female dwarf, represented a mild splenomegaly due to systemic hemorrhage, in part, and to sinus hyperplasia of undetermined origin. In both patients 29 (210 Gm.) and 31 (190 Gm.) the small increase was due to the reaction from systemic hemorrhages and infection, respectively. In patient 30 there was diminution in the size of the spleen (75 Gm.) associated with general visceral atrophy, the exceptions having previously been noted. Histologically, fibrosis and a moderate degree of hemosiderosis were observed.

SECONDARY SPRUE

Of the 4 patients with secondary sprue, patient 14 died in a bout of small intestinal obstruction subsequent to lymphosarcoma. Patient 21 succumbed to the combined effects of a malignant renal tumor (hypernephroma) and generalized amyloid disease with resultant renal insufficiency. The course of patient 28 was terminated by a fulminating widespread miliary tuberculosis, while patient 34 wasted away gradually because of the underlying primary condition, Hodgkin's granuloma, which preceded her amyloid disease.

Small Intestine.—Almost no portion of the small bowel was spared by lymphosarcoma in patient 14. The mucosa and all the components of the bowel wall were involved, with multiple fistulous tract formation in the jejunum and the ileum. The lumen itself was not compromised anywhere. The gross appearances, except for some thinning of the bowel wall in patients 21, 28 and 34, were essentially those of normal small intestinal tracts. Histologically, however, a different picture was obtained. Patient 21 showed extensive deposition of amyloid material lying along the basement membrane at the absorbing surface, clumps of amyloid in the reticular framework of the villus and involvement of the vessel walls, especially of the submucosa (fig. 7). A similar picture in which, however, the submucosal vessels were relatively more involved was presented by patient 34 (fig. 8). Patient 28 showed the classic features of intestinal lipodystrophy (Whipple's disease). Despite the severest autolytic change, "sections of small intestine showed almost confluent collections of lipoid containing uninucleated cells . . . which virtually replaced the normal contents of the villi . . . down to the muscularis mucosae."[4]

Mesenteric Lymph Nodes.—In patient 14 there was massive involvement of the mesenteric glands by tumor tissue to such a degree that absorption was most likely mechanically impaired. A similar massive involvement was present in patient 28, due this time to nodes which appeared grossly "yellowish and homogeneous," and microscopically showed granulomatous giant cell reaction with many lipoid-containing macrophages.

In decided contrast to the 2 cases just mentioned, the mesenteric glands of patients 21 and 34 revealed no lesions capable of causing interference with intestinal resorption. Except for an incidental focus of acute inflammation in one of the nodes of patient 21, there were no abnormalities. Patient 34 had nodes that were not even of normal size, while histologically they showed merely a severe depletion of the lymphoid elements.

Liver.—A hepatomegaly of considerable proportions was present only in patient 21 (2,600 Gm.), secondary to extensive deposition of amyloid material. Subsequent hepatic cellular compression was present. The enlargement of the liver in patient 34 could be accounted for by congestion. The organs of patients 14 and 28 were not remarkable in themselves and showed focal evidence of lymphosarcoma and recent tuberculosis, respectively.

Spleen.—The moderate splenomegaly (250 Gm.) which existed in patient 21 could be accounted for by amyloidosis. There were no changes which might perhaps be significant for the sprue syndrome in patients 21 and 28. The spleen of patient 34 had been removed surgically fourteen years previously for hemolytic icterus.

COMMENT

The foregoing analysis of primary and secondary sprue is incomplete in many respects. The group having primary sprue comprises 36 patients, the group with secondary sprue only 4. The available data permit delineation of primary and secondary sprue. While there are some similarities, the prevailing dissimilarity may be used for differential diagnosis (table 5). The age range is almost identical in both groups, the averages being 41 and 44 years.

There is a striking difference in the average duration of the disease before hospitalization became necessary: 80 months in primary and 4.75 months in secondary sprue. In other words, the average patient with primary sprue had been suffering from the symptoms of the disease for many years before hospitalization became necessary because this disease, like most of the other nutritional disorder, is characterized by spontaneous remission and exacerbations, not infrequently on a seasonal basis. In contradistinction, the organic disease associated with secondary sprue showed in all patients a rapidly progressive course with eventual fatal outcome and thus required hospitalization after a comparatively short period of four to five months. Considerable loss of weight was a feature that both groups had in common.

While lesions of the mouth and tongue were outstanding clinical signs in primary sprue they seemed to be of minor importance in secondary sprue. Burning and soreness of the mouth and tongue, which interfered seriously with alimentation in primary sprue, were only an occasional minor complaint in secondary sprue.

Clubbing of the fingers was infrequent both in primary and in secondary sprue. Its cause in primary sprue was obscure. It was nonetheless obscure in 1 instance of secondary sprue (case 14), in which there was massive involvement of the intestine by lymphosarcoma. Such clubbing is not infrequently seen in other conditions associated with equally severe lesions of other types, that is, ulcerative colitis.

The hematologic observations differed considerably in the two groups. Although secondary sprue was characterized by more or less serious organic disease, the hemoglobin and erythrocytes were on a higher level than in primary sprue: hemoglobin 62 and 74 per cent, and erythrocytes 3.0 and 3.9 million, respectively. The color index definitely is of differential diagnostic aid. In 89 per cent of the cases of primary sprue the color index was 1 or less than 1. In secondary sprue it was invariably less than 1. In other words, a persistently low color index in the absence of bleeding phenomena together with obvious iron deficiency in a case of sprue syndrome should be considered highly suspicious of secondary sprue. The leukocyte cell count averaged 6,712 in primary and 10,525 in secondary sprue. The severe case of primary sprue usually showed leukopenia in association with macrocytic hyperchromic anemia. In contrast secondary sprue showed a tendency to moderate leukocytosis in association with mild hypochromic anemia. In the graver manifestation of the disease, primary sprue was characterized by low platelet counts, low prothrombin levels and evidences of general bleeding, while secondary sprue showed absence of the last mentioned. The bone marrow in the active stages of the disease was characteristically erythroblastic or megaloblastic in primary and essentially normal in secondary sprue.

The findings in the varied studies of gastrointestinal function were similar in both groups. Presence of free hydrochloric acid was encountered almost regularly in both groups. The type of diarrhea and steatorrhea was similar in both groups. Frequent, bulky, frothy, loose to semisolid stools containing only small amounts of neutral fat and an abundance of fatty acids and soaps were observed. The average fat content of the dried fecal material was 38 per cent in primary sprue; a quantitative fat analysis was performed in only 1 case of secondary sprue and proved to be 47 per cent.

4. We are indebted for the postmortem findings in this case to the Department of Pathology, Johns Hopkins Hospital, Baltimore.

There was no noteworthy difference in the roentgenologic observations. In both groups disturbed motility and alteration of the pattern (deficiency pattern) were the characteristic features. Only in 1 case of secondary sprue (case 14) were there peculiar areas of constriction and serration suggestive of a different type of intestinal involvement. Thus, careful roentgenologic studies may prove in some instances to be of great help in revealing the underlying intestinal disease in cases of secondary sprue.

The chemical analysis of the blood failed to reveal any characteristic differences between the two groups. The blood protein levels were low normal in both (5.8 and 5.85 Gm. per hundred cubic centimeters). Pronounced hypoproteinemia was a rare finding in some of the most serious cases of primary sprue. The absence of decided hypoproteinemia in secondary sprue is not significant in view of the small number of cases observed.

The calcium content of the serum was low in both groups, 8.1 and 8.4 mg. per hundred cubic centimeters, and manifestations of tetany were observed. Thus, the presence or absence of tetany is not of differential diagnostic importance. The serum phosphorus tended to be low in some instances of primary sprue, the average being 3.4 mg. per hundred cubic centimeters. The corresponding figure in secondary sprue was 5.1 mg. While elevation of the alkaline serum phosphatase was frequent in primary sprue (average 17.9 King-Armstrong units) and was associated with osteoporosis, no corresponding determinations were available in secondary sprue.

The dextrose tolerance tests presented typically flat curves in both groups, while the blood sugar curves after intravenous administration of the sugar showed as a rule the normal elevation and decrease of the blood sugar level.

The alterations of the vitamin A metabolism were also identical in both groups: extremely low levels of both vitamin A and carotene in the blood and lack of a postprandial elevation of the vitamin A level in the vitamin A tolerance test. The carotene concentration of the blood was strikingly low in both groups. Pancreatic enzymes were found to be present in the duodenal content in primary and secondary sprue.

In some instances of primary sprue enlargement of the liver and impaired hepatic function were found; other observations included mild icterus, low levels of blood cholesterol and cholesterol esters and impairment of hippuric acid synthesis. While corresponding determinations were not performed in secondary sprue, none of the patients had icterus or any clinical evidence of hepatic dysfunction.

The therapeutic response was certainly of diagnostic importance. With few exceptions there was a definite improvement of the hematic picture and the bowel function in primary sprue, while the progressive course and fatal termination of secondary sprue could not be influenced by therapy.

Thus, the clinical differentiation of primary versus secondary sprue was possible on the basis of differences in the history and duration of symptoms, the presence of typical oral lesions, the different hematologic findings and the response to specific therapy.

Analysis of the pathologic data in primary and secondary sprue offers an explanation for some differences in the clinical picture. Many other problems remain obscure and require careful additional study. The relatively short history and duration of symptoms in secondary sprue becomes understandable. The underlying morbid process leads to a rapid fatal termination. In contrast, primary sprue is a chronic disease with periods of remission and relapse. The typical oral and lingual lesions of primary sprue apparently require many months or years for their full development and are therefore only of minor importance in secondary sprue. They must be considered in the light of our present knowledge as evidence of nutritional deficiency, for instance, of factors of the vitamin B complex (nicotinic acid, riboflavin, folic acid and possibly other factors as well). This deficiency plays only a minor role in the short "life history" of secondary sprue.

The hematologic differences in both groups may be similarly explained. Primary sprue is characterized by a macrocytic, hyperchromic anemia with erythroblastic and/or megaloblastic arrest of the bone marrow and thus resembles other macrocytic anemias (addisonian anemia, macrocytic nutritional anemia, and the like). On the other hand, secondary sprue presents a hypochromic type of anemia with a normal bone marrow as usually seen in wasting disease. The therapeutic response in primary sprue is based on replacement of the deficient nutritional factors by the administration of extract of liver or folic acid. While the majority of cases of primary sprue show a dramatic therapeutic result, no response can be expected in secondary sprue, which is not of nutritional origin.

The pathologic findings in sprue will be discussed only briefly. Striking anatomic alterations are not commonly observed in primary sprue of either the tropical or nontropical variety. What findings there are consist chiefly in atrophy.[5] It is therefore noteworthy that in all but patient 1 (on whom there were no sections of the small intestine) a relatively uncommon lesion was present (table 7).

Hemofuscinosis of the muscularis propria of the gastrointestinal tract was present in 2 patients (cases 7 and 31). The significance of these findings is not completely clear, but it may well be related to the "ceroid" pigment, as described by Pappenheimer and Victor[7] in animals deficient in vitamin E and in man with malabsorption syndromes. It is well known that in sprue there is malabsorption of all fat-soluble vitamins. These patients present evidence of deficiency of vitamin A (clinical changes and chemical evidence), vitamin D (osseous changes and abnormalities of calcium metabolism) and vitamin K (bleeding and hypoprothrombinemia). Hypovitaminosis E might well round out the picture. Whether some of the changes in pigmentation may be accounted for by vitamin E deficiency is conjectural at present.

The lesion in the small intestine of patient 29, consisting of villus deformities with stromal hyaline band formation and subsequent vascular distortion, has been described in greater detail elsewhere.[5] The implications of such a lesion for the disturbance in the transport of nutrients across the intestinal membrane is obvious, especially in view of its widespread character.

The hyaline lesions occur predominantly at the villus tips which are notoriously susceptible to autolysis or inadvertent trauma in the routine examination of the intestine. Therefore, the possibility exists that more cases of primary sprue handled with the necessary precautions at the postmortem table may present similar findings. In view of the relatively delicate histologic

5. Schein, J.: Syndrome of Non-Tropical Sprue with Hitherto Undescribed Lesion of the Intestine, Gastro-Enterol. 9: 438, 1947.
7. Pappenheimer, A. M., and Victor, J.: "Ceroid" Pigment in Human Tissues, Am. J. Path. 20: 395, 1946.

character of this lesion, it was deemed advisable to retain this case in the group of primary sprue. However, the impression is gained that such a case might be included with justification in the group of secondary sprue.

In this material there certainly seem to be no characteristic changes of the large bowel in sprue. The mesenteric lymph nodes which lie astride the absorption pathways of the small intestine deserve careful consideration. The chronic mesenteric lymphadenitis as found in patient 29 may be related to a chronic process of which the intestinal lesions were the end result. The unusual disproportionate trabeculation of the mesenteric glands in patients 31 and 35 cannot be evaluated at present. The absence of such a lesion in a preliminary control series of 40 mesenteric nodes is suggestive that these observations, whose counterpart was not found elsewhere, may have some significance in the pathogenesis in these 2 cases. This, however, must await further study.

In view of the importance of the pancreas in the digestion of fat, the results of examinations of this gland deserve comment. No apparent reason, such as cholelithiasis, could account for the various degrees of fibrosis observed. This is in contrast to the 2 instances (cases 21 and 34) of secondary sprue, in which similar lesions could be attributed to coexisting calculous cholecystitis. There was no evidence during the lifetime of either patient of any disturbance in the external pancreatic secretion in sprue.

The role of the liver has naturally been the subject of discussion in a disease so frequently associated with a macrocytic hyperchromic anemia.[1b] The centrolobular fibrosis which is the result of chronic congestive phenomena is in itself not the cause of any serious functional derangement of the liver. The hepatic necrosis (patient 29) occurred as a unique complication in a person suffering from the chronic malnutrition of sprue. Steatosis of the liver is certainly not a characteristic lesion, since it may be found in many other disease states. Its extent in patient 30 was striking. One may wonder whether the severe hypoproteinemia, present only in this case since the inception of the illness twelve years before, might not have been related to the state of the liver.

No changes of the spleen characteristic or significant for sprue were observed.

Despite the implication of the adrenals[8] and the parathyroids[9] in the causation of steatorrhea, no definitive abnormalities were observed in this material. No satisfactory explanation can be offered at the present time for the conspicuous proliferation of connective tissue in the parathyroid gland of patient 30.

The observation of erythroid hyperplasia is not surprising, since this picture is frequently seen in many anemic states. The absence of the classic megaloblastic arrest at necropsy is most probably due in these cases to the preceding specific liver therapy.

The findings in the skin, especially in regard to pigmentation, do not differ from those previously described. The coloration is due to an increase in the melanin content of the basal layers of the epidermis. Hemofuscin has thus far not been found in the skin of these patients.

The pathologic alterations in the group of secondary sprue acted in a mechanically demonstrable way to interfere with intestinal resorption. This occurred either through direct involvement of the intestinal wall or the tributary lymph channels (lymphosarcoma and intestinal lipodystrophy). It should be pointed out that mechanical obstruction to such a degree as to permit similar clinical pictures was possible in the other 2 patients (cases 21 and 34), who had no mesenteric adenopathy or gross intestinal involvement. Only histologic examination was able to reveal sufficient structural damage (amyloid deposition). The inference is justified that the gross examination should always be supplemented by a critical scrutiny of the microscopic picture, even in seemingly negative cases. To our knowledge the importance of amyloid deposition in the small intestine for the production of the sprue syndrome has not received its deserved attention.[5]

Aside from the typical cases of primary sprue which present no diagnostic difficulties, there is a group of milder or incomplete clinical instances that remain diagnostic problems. There is the group of otherwise typical primary sprue without diarrhea, in which only the high fat content of the formed normal stool will establish the diagnosis. Sprue in partial remission may similarly resemble a forme fruste of the disease by the absence of diarrhea or presence of an iron-deficiency type of anemia instead of the characteristic macrocytosis and hyperchromia. Some years ago one of us (D. A.) published observations on small intestinal hypermotility in the presence of large amounts of fatty acids and soaps in the stools[10] in the absence of characteristic hematologic changes. Such patients present themselves in the clinics complaining of vague abdominal symptoms. We were of the impression that they also may represent mild or initial instances of primary sprue. In such instances the performance of dextrose and vitamin A tolerance tests is of great confirmatory value.

The response to specific therapy in primary sprue was variable. There were instances of complete cure without a relapse for many years, both in the tropical and in the nontropical variety of primary sprue. The majority of the patients with a prolonged course required continuation of liver therapy and special diet for long periods of time. Some of the patients had to be maintained on liver therapy for as long as twelve years. In others no complete remission, at least in regard to the function of the bowel, could be achieved. And there were, finally, therapy-resistant patients, who failed to respond to large amounts of the refined as well as of the crude liver extract and, as seen in 1 instance, to folic acid.

The role of folic acid in the therapy of sprue cannot be fully evaluated at the present time. It was given orally to 6 patients in amounts of 15 to 30 mg. a day. The observed effects resembled those of liver therapy, hematologically and coprologically, and were probably not better. The relationship of folic acid to liver therapy, to the intrinsic and extrinsic factors has not been established. Although the cost of adequate folic acid therapy is at the present time excessive, the ease of its administration offers definite advantages in a chronic disease of this sort. It is as yet unknown whether this factor has to be supplied continuously or periodically. We had no opportunity to use thymine or xanthopterine in the treatment of sprue.[11]

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SUMMARY

1. Forty cases of the sprue syndrome are reported, which are divided into two groups comprising 36 patients with primary and 4 with secondary sprue.

2. The clinical differentiation of the two types of sprue was possible on the basis of duration of symptoms, presence of typical oral and lingual lesions, characteristic hematologic changes and response to therapy. The gastrointestinal observations were essentially similar in the two groups, as was a chemical analysis of blood, duodenal contents and feces.

3. Postmortem examination was performed in 10 cases, in 9 of which there were noteworthy findings and in 1 of which complete study was not possible.

4. The pathologic changes consisted of unique findings in intestinal villi (hyaline band formation) and mesenteric glands (disproportionate trabeculation). Amyloid involvement of the small intestine was observed in 2 instances. Abdominal lymphosarcomatosis and intestinal lipodystrophy each occurred once. Pigment deposition (hemofuscin) was encountered in 2 instances in the small intestine, and extreme steatosis of the liver was observed once. In 4 of the 6 patients whose disease was designated as primary sprue there were varying degrees of pancreatic fibrosis which were not accounted for by biliary disease. The possible relationship of the pathologic changes to sprue has been discussed.

ABSTRACT OF DISCUSSION

DR. GEORGE BAEHR, New York: Dr. Adlersberg has carefully reviewed the clinical course of sprue and has supplemented it with detailed biochemical studies not only of sprue but of the conditions that are associated with spruelike syndromes. It is important for clinicians to remember that there are variations of the clinical picture of sprue. Sprue in nontropical climates is often difficult to diagnose; in each instance one must always exclude the possibility of a pathologic lesion in the small intestinal tract. Regional ileitis, the disease described by Crohn, Guinzberg and Oppenheimer, is not infrequent. When extensive it may cause so pronounced a reduction in the absorption of fat and fat-soluble vitamins, and even of water-soluble vitamins and minerals, that a profound deficiency disease may be produced, which resembles closely the deficiency manifestations of true sprue, either the tropical or nontropical variety. Diseases of the mesenteric lymph nodes, especially lymphosarcoma of the intestine and lymph nodes, may also result in a multiple deficiency in absorption from the small bowel and induce a clinical picture which resembles, although it is not identical with, that of sprue. I am glad that Dr. Adlersberg stressed that true sprue occurs in temperate as well as tropical climates. Sprue can occur in persons who have never left the cities of this country. Doubt concerning the existence of nontropical sprue, the claim that the only true sprue is tropical, is no longer valid. Dr. Adlersberg's observations, as well as those of others, adequately demonstrate that there is typical sprue in this country, absolutely indistinguishable clinically, biochemically or pathologically from tropical sprue. Unquestionably, the disease is much commoner in tropical countries, where there are certain contributing factors, such as the greater frequency of intestinal disorders throughout childhood and adult life, which favor the appearance of this deficiency disease in certain predisposed persons. In the tropics there are also other causes for multiple vitamin and other nutritional deficiencies, such as differences in dietary habits, which must play a contributory role in precipitating the manifestations and multiple deficiencies which are called sprue, a disease characterized by a failure to absorb a variety of essential nutritional elements from the intestinal tract. Concentrated liver extract and folic acid, both of which are frequently effective in the treatment of sprue, are usually completely ineffective in the spruelike clinical picture accompanying organic diseases of the small intestines or of the mesenteric lymph nodes. Unfortunately, this is not a reliable differentiating criterion. There are cases of true sprue, tropical and nontropical, which do not respond completely to therapy with folic acid or with concentrated liver extract and will respond to a crude liver extract. There is something in crude liver extract which in some instances is better than either the more concentrated preparation or even folic acid.

DR. DANIEL M. SILVERMAN, New Orleans: In 1924 I called attention to the endemicity of sprue in and about New Orleans in studies which included for the first time the analysis of pancreatic enzymatic concentrate of the duodenal contents in cases of sprue. Prior to that, Brown of Johns Hopkins had made such studies by analysis of the stool. He thought that in the stool examinations there was a deficiency of pancreatic enzymatic activity, but my studies of duodenal contents made with and by the epinephrine method showed what Dr. Adlersberg reported today, that those enzymes were normal. Unlike the case in pernicious anemia, I found that the gastric contents showed hydrochloric acid. These cases of sprue which originated in Louisiana did not differ from the true sprue which is imported, particularly from China and the Philippine Islands. The point brought out by Drs. Adlersberg and Schein that concomitant diseases may present the picture resembling that of sprue is well made in the light of my work in the South with the dysenteries. Like pellagra, sprue is associated not infrequently with Bacterium dysenteriae infection. As Dr. Adlersberg in pellagra syndrome found the strain of B. dysenteriae, so also in pellagra, in true sprues and in studies in recent years there have been found the so-called pathognomonic small intestine, mucosal pattern of sprue; namely, the segmentation and flocculation of barium in the small intestine is not always pathognomonic or characteristic of sprue. Colburn found it in cases of hyperproteinemia, primary and secondary deficiency disorders. It is not infrequently found in chronic infections due to Salmonella and B. dysenteriae. With reference to treatment, results of modern methods are better than were some of those used twenty-five years ago. With infections due to the Salmonella, much lemon juice and large doses of meat, which patients had not been accustomed to eating, were given.

DR. J. E. GOSSARD, Sierra Madre, Calif.: I have 5 patients with sprue now under my care, so I am grateful to Drs. Adlersberg and Schein, especially for the pathologic demonstrations. One should also thank Dr. B. K. Ashford for studies which, although made years ago, were effective in the treatment of sprue. They may be found outlined in Tice's Practice of Medicine, volume 4, page 190—"no less than a pound of meat per day is recommended." It now seems that general practitioners everywhere should be warned to keep a sharp lookout for the disease. Any chronic peasoup diarrhea with macrocytes in the blood should be further studied. Achlorhydria and a peculiar typical tongue may or may not come into the clinical picture early.

DR. DAVID ADLERSBERG, New York: In regard to therapy of sprue, many patients responded more satisfactorily to crude than to refined liver extracts. Some of them were cured by a single course of specific therapy and never relapsed, while others required, almost like persons with pernicious anemia, continuous therapy over many years. The so-called deficiency pattern of the small intestine is not specific but is characteristic of sprue. I think this is the best way to say it: A similar pattern may be found on roentgen examination of the small intestine in hypoproteinemia or allergic shock or may be produced by the administration of morphine or by the addition of oil to the barium suspension. Despite all these limitations, the "deficiency pattern" is still characteristic of sprue. There are many forms or types of sprue that present difficult diagnostic problems and remain undiagnosed. They may resemble that seen in the typical sprue patient who under therapy went into a partial or incomplete remission, who may then show practically normal blood values and normal looking bowel movements, but with an excessively high fat content of the latter (40 to 50 per cent of the dried fecal material). The sprue of the average patient remains undiagnosed for many months. It is especially for the diagnosis of the atypical and mild cases of the disease that the laboratory tests are of great diagnostic help, especially the "flat" vitamin A tolerance test, the "flat" dextrose tolerance test and the quantitative determination of the fecal fat content, as well as the fecal fat partition.

THE MECHANISM OF AMPHETAMINE-INDUCED LOSS OF WEIGHT

A Consideration of the Theory of Hunger and Appetite

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It is generally agreed that the administration of amphetamine ("benzedrine") facilitates the reduction of weight. This effect of the drug was first reported in 1937, when patients receiving amphetamine for other purposes were observed to lose weight.[1] Since that time a number of papers have appeared in which the drug has been reported to be of value in the management of obesity.[2] However, it has not been demonstrated by controlled experiments that the drug actually causes a reduction of body weight.

The mechanism by which the drug apparently facilitates the loss of weight has not been settled. All the possible mechanisms have been suggested in the literature and are summarized in the following outline.

The drug acts to facilitate the loss of weight:

A. By increasing the expenditure of energy
   (*a*) by increasing the basal metabolism as does dinitrophenol or
   (*b*) by increasing muscular activity by causing restlessness

B. By tending to induce negative water balance by promoting diuresis or reducing the intake of water

C. By causing incomplete digestion or absorption of food
   (*a*) by decreasing motility or
   (*b*) by decreasing secretion

D. By reducing the ingestion of food
   (*a*) by decreasing the tone and motility of the empty or fasting stomach or
   (*b*) by decreasing the desire or appetite for food.

DATA IN THE LITERATURE

Results reported in the literature indicate that a dose of from 10 to 40 mg. of amphetamine sulfate increases the basal oxygen consumption of man from 0 to 15 per cent depending on the dose and the individual. The increase lasts up to nine hours but not as long as twelve to twenty-four hours.[3] In human subjects it has not been quantitatively determined whether the increased metabolism, when it occurs, is due to physical activity (restlessness) or to an increase in general cellular oxidation. The consensus is that it is due to restlessness. In rats it has been shown definitely that the drug increases spontaneous physical activity[4] and that this effect diminishes on repeated administration.[4b]

Diuresis has been suggested as the cause of a portion of the loss of weight associated with the administration of amphetamine.[5] Both diuretic and antidiuretic effects have been reported.[6] In anesthetized dogs only the first dose has been found to cause some diuresis; the failure of repeated doses to cause diuresis has been explained as due to a disappearance of the pressor effect of the drug.[7]

Doses of the drug which in rats cause an increase in spontaneous activity do not cause a wastage of food in the feces.[4b] Though doses of 5 to 30 mg. in man may inhibit gastric motility and slow the rate of gastric evacuation[8] and increase slightly gastric secretion,[8b] there is no evidence to show that such effects influence the digestion and absorption of food. The factor of safety in digestion and absorption is large.

No reports in the literature have presented objective data substantiating the impression that amphetamine decreases dietary intake. Likewise, we have found no experiment which has proved that amphetamine itself will cause a loss of weight.

REPORT ON EXPERIMENTS

EXPERIMENT 1 A.—*Does amphetamine sulfate decrease food intake and body weight in human subjects?*

Methods.—Seven obese and two nonobese volunteer subjects were fed three meals a day for two eight week periods separated by a four week vacation. The subjects were permitted to eat only food provided by our kitchen, although they could eat as much or as little of any item as they desired. The amount of each item that each person ate at each meal was recorded. To minimize monotony, three different menus were used and the same menu was presented every fourth day. The only difference between the two eight week periods was that sandwiches before retiring were provided when desired during the second period.

From the Department of Physiology, Northwestern University Medical School.

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The first day of each week each subject was weighed before breakfast, stripped and after voiding.

During the first two weeks of each period no medicament was given. During the second two weeks each subject was given a placebo capsule to take one hour before each meal. During the first period all 7 obese subjects were given 5 mg. of *d*-amphetamine sulfate ("dexedrine") one hour before each meal in the fifth and sixth weeks, and the dose was raised to 7.5 mg. during the seventh and last week for 4 of these 7. Placebos were given to the nonobese subjects during the third to sixth weeks. They then received 5 mg. of *d*-amphetamine sulfate before each meal during the last two weeks of this first period.

In the second period 2 of the 6 obese[9] subjects received 10 mg. of *dl*-amphetamine sulfate before each meal through the fifth, sixth and seventh weeks and 15 mg. during the last week. The other 4 received 5 mg. of *d*-amphetamine sulfate before each meal over the same period of time, and all but 1 had each dose raised to 7.5 mg. the last week. One nonobese subject received 10 mg. of *dl*-amphetamine sulfate and the other 5 mg. of *d*-amphetamine sulfate before each meal during weeks six and seven and 15 mg. of *dl*-amphetamine sulfate and 7.5 mg. of *d*-amphetamine sulfate, respectively, during the last week.

TABLE 1.—*Average Daily Voluntary Food Intake in Calories on Indicated Dose of Amphetamine Sulfate Three Times a Day Before Meals.*

First Eight Week Human Diet Experiment

Subject	Control		Rx d		
	4 Wks.	6 Wks.	5 Mg. 2 Wks.	5 Mg. 4 Wks.	7.5 Mg. 2 Wks.
G. L.	1,550	.....	1,564	.....	1,309
R. W.	3,501	.....	3,215	.....	3,100
J. K.	3,142	.....	2,602	.....	2,250
H. F.	2,005	.....	2,472	.....	2,189
A. L.	1,606	.....	1,704	1,617	.....
M. G.	2,597	.....	2,271	2,073	.....
S. T.	2,985	.....	2,989	2,811	.....
Average	2,615	.....	2,396	2,167	2,250
H. S.	.....	2,809	2,721		
M. A.	.....	2,175	1,475		

Second Eight Week Human Diet Experiment

Subject	Isomer	Control 4 Wks.	Control 5 Wks.	Rx 10 Mg. dl or 5 Mg. d 3 Wks.	Rx 5 Mg. dl or 7.5 Mg. d 4 Wks.	Rx 15 Mg. dl or 7.5 Mg. d 1 Wk.
A. L.	d	2,055	.....	1,561	.....	1,348
M. G.	d	3,038	.....	2,050	.....	1,630
S. T.	d	2,201	.....	2,257	.....	2,475
G. L.	dl	1,697	.....	1,420	.....	1,457
J. K.	dl	3,049	.....	2,612	.....	2,448
H. F.	d	3,046	.....	2,688	2,715	.....
Average		2,570		2,111		1,871
C. W.	d	.....	3,339	2,451*	.....	3,310
H. S.	dl	.....	2,767	2,439*	.....	2,492

* Two weeks.

It is to be noted from chart 1 and table 2 that the obese subjects lost weight when placed on a diet which allowed them to eat all they wanted three times a day and nothing between meals. Part of this may have been due to a desire on the part of 3 of them to lose some weight. They also lost weight during the experiment of the second eight weeks, in which they were allowed to eat before retiring, if they desired.

Placebo capsules had no effect on the average rate of weight loss, but the amphetamine definitely decreased the intake of food and increased the rate of weight loss.

9. One subject withdrew from the experiment at the end of the first period.

It is to be noted that during the vacation period of four weeks, 5 of the 6 subjects regained some of the weight which they had lost. The 1 subject (G. L.) who was determined to lose weight lost 1.5 pounds (0.7 Kg.) during the four weeks vacation but not as much as during the periods of amphetamine administration.

EXPERIMENT 1 B.—*Does amphetamine sulfate decrease food intake and body weight in canine subjects?*

If amphetamine sulfate should decrease the intake of food in canine as well as in human subjects then it would be possible to investigate experimentally the site of action of the drug.

Methods.—Eight dogs were permitted to eat as much food as they desired during a single forty-five minute period each day. The meals were always the same in character, and the animals were fed and cared for by the same few persons throughout the year of experiments. The quantity of food eaten by each animal each day was carefully weighed and recorded. The animals were weighed every five to seven days. When a medicament was administered it was injected by the subcutaneous route one hour prior to feeding. Isotonic solution of sodium chloride was used for control injections.

Results.—The results are shown in table 3.

It is evident that if 2.5 to 20 mg. of *d*-amphetamine sulfate are given hypodermically to a dog one hour before the presentation of a meal the intake of food is decidedly decreased. A dose of 10 to 20 mg. was required to abolish practically all food intake for a period of two weeks. One dog, not shown in table 3, was injected with 10 mg. of the drug one hour before the presentation of food daily for twenty-eight days, during which period the animal ate a total of only 150 Gm. of food. Dog 4 (table 3) ate only 50 Gm. of food during the first ten days when it was injected with 5 mg. of the drug; another ate nothing for twenty-one days. Dog 8 ate nothing for eighteen of the thirty days when it received 5 mg. of *d*-amphetamine sulfate and ate only 10 per cent of its normal intake during the entire thirty day period, during which it lost 26 per cent of its original body weight.

TABLE 2.—*Body Weight (Pounds) at Start of Each Week*

First Eight Weeks' Experiment

	1	2	3	4	5	6	7	8	9
G. L.	155.75	155.75	154.50	153.00	151.75	149.75*	148.50	144.75†	143.00
A. L.	179.25	174.00	173.00	170.00	170.00	168.50*	168.00	165.00	161.25
M. G.	183.00	180.50	181.25	181.00	180.25	177.25*	175.25	173.00	174.50
R. W.	188.00	188.00	190.00	188.50	189.50	187.00*	186.75	186.25†	186.75
J. K.	155.75	156.00	156.00	154.50	154.00	153.75*	153.25	149.75†	149.00
H. F.	191.75	188.00	186.75	185.75	184.25	180.50*	180.25	177.00†	176.00
S. T.	215.25	212.25	212.00	212.25	213.50	210.75*	209.00	207.00	206.75
Average	180.80	179.20	178.50	177.80	177.80	175.30*	174.10	171.00†	171.00
H. S.	149.75	148.75	150.00	149.50	150.00	150.00	149.50	148.00*	147.50
M. A.	121.50	121.50	120.75	121.75	121.75	121.75	120.50	120.00*	117.75
Average	136.60	135.10	135.40	135.60	135.90	135.90	135.10	134.00*	132.60

Second Eight Weeks' Experiment

G. L.	142.50	143.50	140.50	140.50	141.00	139.00*	139.00	137.50	136.50†
A. L.	165.75	164.75	164.00	164.00	162.50	159.50*	159.50	157.00	157.50†
M. G.	178.00	176.75	178.00	179.75	178.50	174.75*	173.50	172.50	167.00†
J. K.	158.50	157.50	158.00	158.00	155.25	153.00*	154.00	153.50	153.25†
H. F.	185.25	182.25	180.75	179.00	178.50	174.25*	173.50	172.00	171.75
S. T.	211.00	211.00	209.50	208.50	207.00	205.00*	204.00	205.50	203.50†
Average	173.50	172.60	171.40	171.50	170.00	167.50*	167.30	166.30	164.90
H. S.	147.00	149.50	148.00	149.50	148.00	147.50	145.00*	145.00	143.00†
C. W.	150.75	151.00	151.00	154.00	152.25	154.50	154.00*	152.50	150.50†
Average	148.90	150.25	148.50	151.80	150.10	151.00	149.50*	148.80	146.80†

* First week of medication.
† Increased dose.

Other points established during this experiment will be mentioned. First, when the administration of the drug was discontinued and isotonic solution of sodium chloride was injected instead, the animal ate voraciously. There was no evidence of conditioning to the injection. Second, when a dose of the drug which caused only about a 50 per cent reduction in the intake of food was given daily, the drug became less and less effective. This may have been due to the development of tolerance to the anorexic effect of the drug or to the accumulating dietary deficit. Third, the animals even when injected with relatively large doses of the drug continued to manifest interest in being fed. They were always fed in the same order and displayed the same jealousy when the dog ahead was being fed. They maintained interest until the pan of food was placed in the cage, after which they would smell it and turn in a circle; look at it and turn again, and then lie down or watch the person who fed them complete his work. The animals failed to manifest any behavior suggesting dependence on or craving for the drug. Only 1 animal started out by resisting the injections and continued to do so.

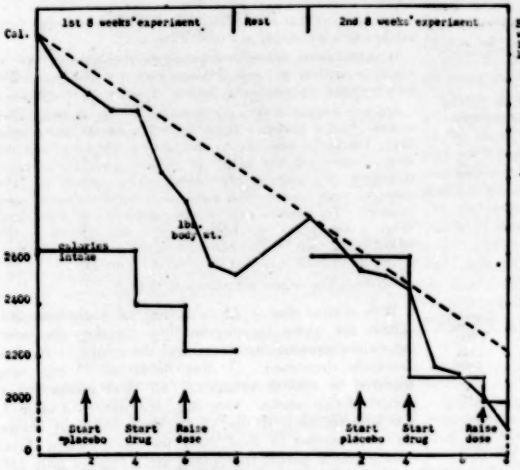

Chart 1.—Obese subjects on ad libitum diet.

EXPERIMENT 2.—*Does amphetamine sulfate cause a loss of weight in human subjects when the caloric intake is maintained regardless of anorexia?*

It was believed that if amphetamine sulfate caused a loss of weight by some mechanism other than by decreasing the intake of food this could be demonstrated by placing subjects on a constant diet and having them eat all the food presented, even though they did not desire it after taking the medicament.

Methods.—Ten volunteer medical students of normal weight were obliged to eat 3,000 calories at the three meals served to them each day for fourteen consecutive weeks. The diet was well balanced, and except for meat, potatoes and dairy products items of the diet came from canned foods. Each item of canned food was always from the same pack, in order to insure against changes in caloric, vitamin or mineral content of the menu. These men lived together in a dormitory and were weighed immediately after arising and voiding, every fourth morning. Placebos were given before each meal during the third and fourth weeks. From the fifth week, subjects 1 to 5 received 10 mg. of *dl*-amphetamine and subjects 6 to 10 received 5 mg. of *d*-amphetamine before each meal, every day until the thirteenth week (fifty-six days), when placebos were again given until the end of the experiment.

Results.—The body weight of each subject at each weighing is shown in table 4. In the last column of table 4 is shown the average weight of the group for eight day periods, excluding subject 6 who was sick for two weeks. The significance of the rate of loss of weight before, during and after the period of amphetamine becomes apparent on the inspection of chart 2.

It is to be noted that a loss of weight occurred during the twenty-six day control period. Evidently the 3,000 calories allowed each subject was inadequate to maintain the body weight of the group; in fact, it was adequate for the maintenance of body weight in only 3 of the 10 subjects. The group lost an average of 0.7 pound (0.3 Kg.) during the twenty-six days of control, which is at a rate of approximately 0.03 pound (0.01 Kg.) per day. Then, on taking amphetamine, the loss of weight became precipitous, 1 pound (0.5 Kg.) being lost in a week. After this, however, only ½ pound (0.23 Kg.) was lost in forty-eight hours.

It is to noted also that 3 of the 10 subjects (1, 4 and 10) did not lose any weight during the control period, which shows that the allowance of 3,000 calories was adequate. One of the 3 (subject 10) did not manifest a significant decrease in body weight when amphetamine was given, while the others (subjects 1 and 4) did.

These observations show that in some persons a dose of 5 mg. of *d*-amphetamine sulfate or 10 mg. of *dl*-amphetamine sulfate does not have a sufficient effect on total energy metabolism or other mechanisms to cause a loss of body weight when the caloric intake is constant. In other persons these doses of the drug are adequate to increase the total energy metabolism or total loss of water by the body enough to cause a temporary increase in the rate of weight loss. The fact that the acceleration of weight loss due to the drug is temporary indicates that a tolerance results. This is also characteristic of the results of the preceding experiments.

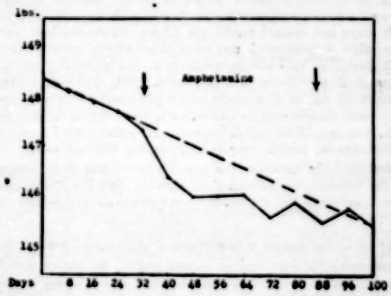

Chart 2.—Rate of loss of weight before, during and after the administration of amphetamine.

This experiment has clearly shown that amphetamine-induced loss of weight is almost entirely due to anorexia.

As little as a 10 per cent increase in general metabolism can account for the extra weight lost during the first few days of medication. This explanation is particularly feasible because some degree of wakefulness was reported by all but the 2 subjects (1 and 10) who lost

The total daily urinary output of each of these subjects was collected for the purpose of studying the metabolism of the drug.[10] The results showed no increase in urinary output during the first four to eight days of medication.

TABLE 3.—*Summary of the Various Experimental Regimens*

The effect of d-Amphetamine Sulfate on Voluntary Food Intake and Ultimate Weight (prior to Surgery)

Dog	Dose, Mg.	Length of Period, Days	Average Daily Food Intake, Gm.	Body Weight at End of Period		
				Kg.	Change, Kg.	Change,* %
1	..	0	.....	17.60		
	0	39	545.0	18.60	1.60	9.4
	2.5	20	512.0	19.20	0.90	4.8
	0	5	698.7	18.80		
	10	18	379.6	17.60	−1.20	− 6.4
	15	11	327.7	17.35	−0.25	− 1.4
	20	32	195.6	14.80	−2.55	−17.2
	0	35	698.7	17.90	3.10	17.3
	20	15	24.5	15.65	−2.30	−12.8
	0	30	698.0	18.80	2.80	17.9
2	..	0	.....	9.80		
	0	38	355.0	12.00	2.20	22.4
	2.5	20	173.2	10.80	−1.10	− 9.1
	0	44	307.9	13.60	2.70	24.7
	1	20	23.7	10.10	−3.20	−25.7
	0	25	307.8	12.15	2.05	20.2
3	..	0	.....	15.20		
	0	37	400.0	16.10	0.90	5.9
	2.5	21	310.2	16.10	0	0
	5	34	285.6	15.65	−0.45	− 2.7
	10	32	53.2	11.30	−4.30	−27.4
	0	50	645.4	17.40	6.10	53.9
	10	15	49.2	14.40	−3.00	−17.2
	0	46	639.0	19.90	5.50	38.1
4	..	0	.....	14.80		
	0	37	370.0	15.10	0.30	2.0
	2.5	21	340.0	15.70	0.60	3.9
	5	33	242.5	15.10	−0.60	− 3.8
5	..	0	.....	11.30		
	10	22	169.4	13.50	−1.80	−10.5
	0	34	471.3	16.20	2.70	20.0
	15	15	34.6	13.35	−2.85	−16.2
	0	29	387.8	16.25	2.95	21.7
6	..	0	.....	11.30		
	0	42	383.0	12.20	0.90	7.9
	5	31	91.3	9.70	−2.50	−20.4
	0	20	441.2	12.15	2.45	25.2
	7.5	14	19.6	10.00	−2.15	−17.6
	0	47	357.3	12.40	2.40	24.0
6	..	0	.....	14.30		
	0	42	383.0	14.35	0.50	3.4
	5	11	136.3	13.40	−0.95	− 6.6
	10	27	103.5	10.40	−2.90	−20.8
	0	23	488.0	13.60	2.40	22.6
	10	14	53.9	11.15	−1.85	−14.2
	0	47	448.3	13.85	2.70	24.2
7	..	0	.....	18.15		
	0	42	480.0	19.35	1.20	6.6
	5	11	179.5	17.75	−1.60	− 8.2
	10	27	30.9	13.50	−4.25	−23.9
	0	23	671.3	18.10	4.60	31.1
	10	14	8.2	14.65	−3.45	−19.0
	0	47	618.1	19.25	4.60	31.3
8	..	0	.....	12.55		
	0	42	330.0	12.65	0.10	0.8
	5	30	29.6	9.30	−3.35	−26.4
	0	44	343.8	11.55	2.25	24.1
	5	13	34.6	9.75	−1.80	−15.5
	0	34	378.0	11.55	1.80	18.5

* Calculated as the difference between the weight at the end of the period and the weight at the beginning, divided by the weight at the beginning of the period.

TABLE 4.—*Table of Body Weights in Pounds (Constant Food Intake)*

Date	Subject										Average	Average 8 Days
	1	2	3	4	5	6	7	8	9	10		
1/17	137.50	149.50	157.00	142.50	161.50	156.50	147.00	147.50	145.00	148.00	148.4	
1/21	137.00	148.75	154.25	142.75	161.25	155.00	146.50	147.50	145.50	148.25	147.9	148.15
1/25	137.50	149.50	154.00	142.50	159.50	156.50	146.75	146.75	146.25	149.50	148.0	
1/29	136.75	148.75	154.50	143.00	159.75	155.00	147.00	147.75	145.00	148.50	147.9	147.95
2/ 2	136.75	147.75	154.00	142.50	159.25	155.00	147.00	147.75	144.50	148.00	147.4	
2/ 6	139.00	148.75	154.25	143.00	159.25	152.50	147.00	148.50	145.00	149.50	148.1	147.75
2/10	137.75	146.50	152.50	142.00	159.25	152.25	147.00	148.50	144.25	148.75	147.1	
2/12	139.50	147.75	154.25	143.00	159.25	151.75	145.00	147.25	143.75	149.50	147.6	147.35
Period of Medication 2/16 to 4/9												
2/16	139.50	146.00	152.50	140.00	158.25	150.00	144.50	145.50	148.50	148.25	146.3	
2/20	138.50	146.50	152.75	140.25	158.00	149.25	145.00	146.00	143.00	149.50	146.6	146.45
2/24	138.50	145.50	151.25	140.75	157.00	149.00	145.00	144.50	143.00	147.75	145.9	
2/28	136.00	146.25	152.25	140.75	156.75	148.75	145.00	145.50	143.25	148.75	146.2	146.05
3/ 4	137.50	145.25	151.75	141.25	157.50	.....	144.50	144.75	142.75	148.00	146.0	
3/ 8	137.50	146.50	151.50	140.75	156.75	.....	144.00	145.53	143.50	149.25	146.1	146.05
3/12	137.50	146.00	153.00	140.75	157.00	150.25	144.00	145.25	143.25	149.75	146.9	
3/16	138.00	145.50	152.50	140.75	157.00	149.25	144.00	145.50	142.00	149.50	146.0	146.10
3/20	137.00	146.25	151.00	139.75	156.50	147.75	144.00	145.50	141.50	148.50	145.6	
3/24	137.50	145.00	151.00	141.00	157.25	148.00	144.00	145.50	142.50	148.25	145.7	145.65
3/28	137.50	145.50	150.00	140.00	157.00	148.25	144.50	145.50	143.50	150.00	146.0	
4/ 1	137.50	143.75	153.00	140.00	157.25	148.00	144.00	146.00	142.75	149.50	145.9	145.95
4/ 5	137.50	144.00	151.50	139.75	156.75	147.75	144.00	145.00	143.00	147.50	145.3	
4/ 9	137.50	143.50	152.50	141.00	157.00	147.50	145.00	145.00	143.25	147.75	145.8	145.55
4/13	137.50	144.25	153.75	140.50	157.00	146.25	144.00	146.50	142.50	148.25	146.0	
4/17	136.00	144.50	153.00	139.00	157.50	146.75	142.50	145.00	143.00	149.00	145.7	145.85
4/21	138.00	144.00	153.50	139.00	156.25	147.25	143.50	145.00	142.50	148.50	145.5	145.60

The averages exclude the record of subject 6, who was sick most of the time.

least on medication. Obviously, if sleeplessness occurs and restlessness prevails, a 10 per cent increase in the utilization of energy is entirely possible. It must also be reported that by coincidence the final examination period coincided with the first week of medication. That this might be significant is suggested by the fact that subjects 1 and 10 were upperclassmen and had only a few examinations to take.

EXPERIMENT 3.—*Does amphetamine cause anorexia in dogs when the stomach and upper part of the intestine are extrinsically denervated?*

In the previous experiment it has been found that the chief cause of weight loss when amphetamine is given is a decrease in the desire for food. This might be due to a decrease in

10. Harris S. C.; Searle, L. M., and Ivy, A. C.: J. Pharmacol. & Exper. Therap. **88**: 92, 1947.

gastric hunger tone and motility. To examine this question the stomach and upper part of the intestine were denervated.

Method.—Four of the same dogs used in the previous experiment were subjected to a supradiaphragmatic bilateral vagotomy and later to bilateral splanchnolumbar sympathectomy verified by autopsy.

TABLE 5.—*Canine Anorexia Studies After Neurectomy*

Dog	Surgery	Medication: Dose, Mg./d	Medication: Duration, Days	Average Daily Food Intake, Gm.	Body Weight at End of Period, Kg.
1		0	30	668.5	18.60
	Splanch.				
		0	15	643.3	
	Splanch.				
		0	6	611.0	17.50
		20	10	0	15.35
		0	13	639.6	17.95
	Vagot.				
		0	15	548.6	17.05
		20	13	5.3	14.90
		0	41	541.2	18.15
2		0	25	397.8	12.15
	Vagot.				
		0	25	408.2	12.30
		5	14	99.2	10.55
		0	10	576.0	11.95
	Splanch.				
		0	11	481.0	12.80
		5	13	25.7	10.20
		0	76	357.7	13.80
3		0	46	638.0	19.70
	Vagot.				
		0	25	505.5	19.90
	Splanch.				
		0	64	527.6	19.75
4		0	28	387.8	16.50
	Vagot.				
		0	10	473.0	16.35
		15	10	5.0	14.00
		0	40	386.6	16.30
	Splanch.				
		0	52	402.1	16.55

The effect of the operation on the intake of food was followed, and then the effect of the drug was determined.

Results.—The results are summarized in table 5.

Comparison of the results in table 5 with those in table 3 shows that the anorexia produced by amphetamine is not interfered with by the interruption of sensory nerves from the stomach and intestines. It is also noteworthy that the eating behavior of these animals was the same after as before surgical intervention even when no medicament was administered.

EXPERIMENT 4.—*Does the rather prolonged administration of amphetamine cause any evidence of disturbance of tissue functions in human subjects?*

Since we were planning to give amphetamine over a period of several weeks, it was decided to ascertain if changes in various functional activities might be detected.

Methods.—Blood Studies: Each Monday morning before breakfast, during the first experiment of eight weeks (with food ad libitum) on human subjects, a sample of venous blood was withdrawn from each subject. Red, white and differential counts were made on this blood, and the hemoglobin concentration and blood sugar levels were determined. The method of Sahli was utilized for the hemoglobin test, and the technic of Somogyi was employed for evaluation of the blood sugar level.

Cardiovascular Studies: At the time when blood was withdrawn for the previous tests the systolic and diastolic blood pressures and the pulse rates were determined after the subject had spent at least five minutes in the reclining position.

Kidney Function Tests: Each Monday morning the first urine specimen of the day was brought to the laboratory to be tested for albumin by the nitric acid test and for sugar by the qualitative method of Benedict.

Additional Tests: A sugar tolerance test was performed on the subjects of human experiment 1A, at the beginning of the experiment and at the end of the twenty-eight days of medication. Each subject was given by mouth 1 Gm. of dextrose per kilogram of body weight immediately after a sample of blood was drawn. Samples of venous blood were again drawn thirty, sixty and one hundred and five minutes after the ingestion of the sugar, and all samples were analyzed for dextrose by the method of Somogyi.

The blood serum phosphatase concentration was determined by the method of Bodansky (1) after twenty-six days of medication on the subjects of the first eight week experiment and (2) both before and after fifty-five days of medication during the human experiment 2.

The blood ascorbic acid level of the subjects of the third human experiment was determined twice by Roe's method before medication was begun and after the second and the sixteenth day of medication.

For a rough estimation of total alimentary passage time, three size 00 capsules containing carmine powder were given to each subject during human experiments 1A and 2 just before supper. The time of first appearance and disappearance was noted. This was done twice before medication was begun in experiment 1A and 2, and after nine days of medication in experiment 1A and forty-eight days of medication in experiment 2.

During experiment 2 each of the 10 subjects collected his entire urinary output for all but the first seven days of the experiment. Each daily sample was started after the first morning sample and concluded after the next morning sample. The specimens of urine were kept in bottles, to each of which had previously been added 5 cc. of glacial acetic acid. When the specimens were brought into the laboratory the volume was recorded and two 25 cc. aliquots were taken. One aliquot was frozen and stored for reference, and the other was assayed for its amine content. The assay technic was a combination of certain features of the methods of Beyer and Skinner, Richter, Jacobsen and Gad. The method is presented elsewhere.[10]

Results: The results of several of the tests which we performed on our subjects confirmed studies already reported. These, all of which showed no change, were: red and white

TABLE 6.—*Effect of Amphetamine on Laboratory Data*

Serum Phosphatase as Determined in Bodansky Units

Experiment 1A		Experiment 2		
Subject	Drug 29 Days	Subject	Drug 0	Drug 55 Days
G. L.	1.9	1.	2.0	2.2
M. G.	2.5	2.	2.1	2.4
J. K.	2.6	3.	2.4	2.6
H. F.	3.6	4.	3.2	2.9
S. T.	1.9	5.	2.9	3.1
H. S.	1.8	6.	2.4	2.9
C. W.	2.4	7.	4.7	6.1
		8.	2.1	2.3
		9.	3.1	4.1
		10.	2.7	3.2
		Average	2.5*	2.8*

Blood Ascorbic Acid, Mg./100 Cc.

Subject	Drug 0	Drug 0	Drug 0 Average	Drug 2 Days	Drug 16 Days
1.	0.95	....	0.95	1.60	0.91
2.	1.24	1.45	1.34	1.23	1.35
3.	1.12	0.96	1.04	0.90	1.07
4.	0.84	1.05	0.94	....	1.13
5.	0.55	1.03	0.79	0.93	1.00
6.	1.01	1.27	1.14	0.95	1.41
7.	0.87	1.13	1.00	1.13	1.13
8.	0.80	....	0.80	1.04	0.87
9.	1.07	1.47	1.27	1.05	1.10
10.	0.94	0.86	0.90	0.95	0.87
	0.948		Aver. 1.03	1.02	1.08

* Excluding subject 7.

blood cell counts, hemoglobin determinations, fasting blood sugar levels, sugar tolerance curves and urinary sugar and albumin tests.

The results of studies which have not been reported heretofore on subjects receiving amphetamine sulfate were: the blood ascorbic acid levels, which were not altered[4] (table 6). The blood serum phosphatase was not altered (table 6). The results of the studies on total alimentary passage time (table 7) show

that it was not altered by the drug. The metabolism of the drug, probably by the liver, was not altered.[9] The blood pressure was not changed.

No evidence of toxicity of the drug as employed in these studies was found. This was anticipated in view of the relatively low toxicity of amphetamine.

EXPERIMENT 5.—*Does amphetamine cause anorexia in human patients with bulimia after frontal lobotomy?*

With the idea in mind that amphetamine might decrease dietary intake by acting on the frontal lobe, the drug was given to 6 patients who had developed bulimia subsequent to a frontal lobotomy.

Methods.—Six patients were studied, through the cooperation of Dr. E. Liebert. Each patient was given 10 mg. of *d*-amphetamine sulfate subcutaneously one hour prior to lunch and supper on two successive days. We consider this dose to be relatively large for the human subject. The dining room attendant was asked to record whether the patients ate the usual amount or less.

TABLE 7.—*Carmine Clearance Tests*

Hours from Ingestion to Appearance and Disappearance of Carmine in Stool

Human Experiment 1A

Subject	Appearance in Hrs.			Disappearance in Hrs.		
	Drug 0	Drug 0	Drug 9 Days	Drug 0	Drug 0	Drug 9 Days
G. L.	15.25	13.50	14.0	43.25	..	96
A. L.	13.50	14.00	14.0	.....	..	..
M. G.	20.00	20.50	24.0	44.00	..	72
E. W.	24.00	14.00	14.0	62.00	..	69
J. K.	16.50	14.00	14.0	61.50	60	48
H. P.	15.00	14.00	14.0	45.00	25	48
S. T.	13.00	16.00	24.0	24.00	..	36
H. S.	14.00	14.00	14.0	.....	..	72
M. A.	14.50	14.25	14.0	68.00	..	72
Average	16.80	15.39	16.2			

Human Experiment 2

Subject	Appearance in Hrs.			Disappearance in Hrs.		
	Drug 0	Drug 0	Drug 40 Days	Drug 0	Drug 0	Drug 40 Days
1.	13.5	11.0	14.0	48.0	36.0	37.5
2.	24.5	13.0	22.0	48.5	42.0	34.5
3.	20.0	27.5	18.5	47.0	48.0	23.5
4.	20.0	18.0	27.0	48.0	48.0	37.0
5.	20.0	25.5	20.5	68.5	58.0	73.5
6.	25.0	44.5	20.0	68.0	72.0	65.0
7.	25.0	20.0	42.0	45.5	48.0	61.0
8.	25.0	18.0	18.0	48.0	48.5	48.0
9.	21.5	....	....	24.0	....	....
10.	20.5	16.0	15.0	26.0	30.5	48.0
Average	21.9	23.2	27.9	48.7	51.8	46.6

Results.—During the first day of the experiment none of the patients ate less. During the second day, 1 patient ate less at lunch and 2 less at supper.

The results indicate to us that the patient with a frontal lobotomy is less susceptible to the anorexic effect of amphetamine than is a normal person. Because of the lack of adequate quantitative control data, the results are mentioned solely for their provocative value.

COMMENT

The data show clearly that the administration of amphetamine sulfate can cause in man and dog a loss of body weight which is associated with a reduction of voluntary food intake. When the caloric deficit which results from the decrease in dietary intake is calculated over a period of from two to four weeks, it is found that the loss of body weight is accounted for by the decrease in food taken. (We allow 7.7 calories per gram of weight lost.[11]) However, both collectively and individually more weight was lost by some subjects during the first week than could be accounted for by the caloric deficit due to a decreased intake of food. This extra loss of weight could not be ascribed to diuresis, since the increase in urinary output was not significant.[10] Neither could it be ascribed to an increase in the basal metabolic rate, which was not changed. However, the total metabolism during the period of drug action could be increased while the basal metabolic rate remains normal. An increase of 10 to 20 per cent in total energy metabolism or an extra loss of 100 cc. of urine or body water a day for a few days or some combination of these two factors would balance the energy-body weight account. Substantiation of these interpretations is found in the failure of 10 men of normal weight on a constant caloric intake to lose any appreciable amount of weight during fifty-six days on a dosage of 10 mg. of racemic amphetamine sulfate or 5 mg. of *d*-amphetamine sulfate before each meal. Again in this experiment the greatest individual (3 pounds, or 1.4 Kg.) and average (1.4 pounds, or 0.6 Kg.) loss of weight occurred during the first four days of medication, a quantity which could be accounted for by a modest increase (average 9.2 per cent) in total energy metabolism and body water output.

It is conceivable that this drug may cause anorexia by initiating some type of intoxication. We failed to find that any evidence of chronic toxicity of therapeutic doses of the drug was revealed by tests directed to evaluate the function of the liver, bone marrow and kidney. It is also significant in this connection that these observations confirm the reports in the literature. The appetite immediately returns to normal after the dosage of the drug is discontinued. It is also conceivable that amphetamine acts on the liver, adrenals or some other tissue to cause the production of an unknown substance, which in turn acts on the brain. This possibility seems remote, however. It was thought for several reasons that amphetamine might induce anorexia by affecing the frontal lobes of the brain.

Since the loss of weight observed during these experiments has been principally caused by decreased caloric intake, our attention passes to a consideration of the mechanisms by which the desire to eat is reduced by the drug. It was truly remarkable that by the appropriate administration of amphetamine to the dog, it would starve in the presence of food. This rendered it possible to determine whether the drug abolished the desire for food by acting peripherally on the alimentary tract or centrally on the brain. Because 4 dogs demonstrated unchanged eating behavior and a typical anorexic response to amphetamine after surgical ablation of the sensory nerves (vagi and thoracolumbar visceral afferents) of the gastrointestinal tract, it was concluded that the drug produces anorexia through some action of the central nervous system.

The fact that amphetamine still decreases or may abolish all desire for food after the gastrointestinal tract has been denervated is an important physiologic observation pertaining to the mechanism of hunger and appetite. It shows that the peripheral gastrointestinal sensory aspect of hunger (hunger pains or contractions) in the adult (or conditioned animal) are not important in the control of dietary intake and must be considered as adjunctive in the adult. However, it is not necessary to believe, as is implied in some textbooks of physiology, that the phenomenon called hunger is derived from and solely dependent on hunger contractions of the fasting stomach.

11. Best, C. H., and Taylor, N. B.: The Physiological Basis of Medical Practice, Baltimore, Williams & Wilkins Company, 1945, p. 610.

Since hunger and appetite are confused in current thinking and, in fact, frequently used synonymously, and since the interpretation of the action of amphetamine requires a definition of these terms, they will be defined and discussed.

Historically two general factors, referred to as hunger and appetite, have been concerned in exciting food behavior in the adult. The term hunger has been used to designate the inherent, instinctive or unconditioned aspect and appetite as the learned or conditioned aspect of food behavior.

There are two basic observations, easily confirmed, which indicate that hunger and appetite may be differentiated. First, decerebrate animals and the anencephalic infant manifest decerebrate activity in presence of gastric hunger contractions which occur after the abstinence of food, and the decerebrate activity is abolished some ten or fifteen minutes after they have been fed.[12] Second, the otherwise intact adult animal will feed after the alimentary tract has been extrinsically denervated, and a desire for a particular item of diet may be learned.

With reference to the first observation, the decerebrate activity of hunger has been explained as due to the stimulation of centers below the cerebrum by afferent impulses from the esophagus, stomach and duodenum. That is, the decerebrate activity of hunger is considered to be entirely reflex in genesis. The fact that the activity is abolished so soon after feeding indicates that the abolition of the activity is probably not due to absorbed food acting on the hunger center or centers. However, food such as dextrose has not been given intravenously to ascertain if the activity is or is not abolished. Neither has the extrinsic innervation of the alimentary tract been removed to ascertain if decerebrate hunger activity still occurs.

With reference to the second basic observation, the animal with an extrinsically denervated alimentary tract may feed because of (*a*) learning, (*b*) sensations of weakness or emptiness from somatic tissues or (*c*) the lack of adequate food in the blood. Sensations from somatic or visceral tissues are not appreciably concerned; a dog with the vagi sectioned and a spinal transection (eighth cervical) voluntarily ingests and manifests interest in food and maintains his weight.[13] The role that the composition of the blood plays in the genesis of food behavior in such a dog is unknown, but appetite based on learning certainly exists.

It is obvious that the basic requirements for a learned food behavior are present in the newborn. In accordance with the most widely accepted theory of learning, the animal is born with a set of unconditioned reflexes, which serve as the basis of learned, conditioned behavior or reflexes. The decerebrate activity of hunger is undoubtedly due to unconditioned reflexes. Nursing is another set of unconditioned reflexes associated with feeding behavior. The association of these two sets of reflexes at the time when the brain is developed to the point that association may occur is probably the beginning of appetite. In the human being, the psychic secretion of gastric juice, which is considered to be a conditioned reflex associated with pleasurable experience, occurs at the age of from 6 to 8 months:[14] this may be antedated, however, by the formation of an appetite or a simple type of conditioned food behavior and pleasurable experience.

On the basis of these considerations, one of us (Ivy[15]) has proposed the following definitions of hunger and appetite: "Hunger is a bodily state which is characterized by certain specific activities induced independently of learning (conditioning) by the abstinence from food of a general or specific type and abolished by the intake of food of a general or specific type." The expression "specific type" refers to such food factors as lack of salt (salt hunger) and water (thirst) and certain essential food accessories as vitamins, bulk and minerals. At present it is not known whether the "hunger center" in the brain which is responsible for "certain specific activities" is excited by sensory impulses from the visceral and somatic tissues or by changes in the composition of the blood. Appetite is a conscious[16] (mental) state which is characterized by a desire for food dependent on learning and induced by interest in food, which is due to the sight, smell, taste or thought of (or abstinence from) food of a general or specific type, and which is abolished by the ingestion of the general or specific type of food (to the point of satiety). That is, appetite is the conditioned or psychic component of hunger in the same sense that pain is the psychic or mental adjunct of a primitive, unconditioned avoiding or protective reflex. For example, such a view is required because there is no particular area in the cerebrum which, when stimulated, will give rise to appetite or pain, and an appetite or pain aura does not occur in epilepsy; moreover, there is no primary sensory cerebral area for appetite and pain, which are examples of a pleasurable and a displeasurable sensation or experience, respectively. However, it is well known that areas in the parietal and frontal lobe may be so involved by disease as to decrease the sensation of pain or the appetite for food. Similarly it is known that morphine, for example, decidedly changes a patient's attitude or reaction toward pain. Similarly, amphetamine may affect appetite or a person's attitude toward food.

From the preceding discussion it should be clearly evident that it is theoretically possible for a drug to diminish appetite by acting on the hunger-appetite mechanisms in the brain. Because infectious diseases and fever decrease appetite, it has been conjectured that amphetamine decreases appetite by causing some similar type of intoxication rather than by a direct action on the brain.

We suspect with Lesses and Meyerson[2a] that the drug decreases a desire for food by increasing hedonic tone or interest in other matters. This is supported by Ulrich's report[1c] that he attained more success with amphetamine in reducing the weight of obese narcoleptic persons than of obese alert patients. And there seems to be no doubt that some obese patients eat excessively to substitute for lack of pleasure derived from other pursuits. Also, one of the well recognized effects of amphetamine is to increase the willingness to endure. This assists the patient to overcome any anhedonia or to say "no" to the pleasures of eating. In the dog, however, no problem of will power is concerned.

However, the facts do not permit us to conclude that amphetamine causes anorexia only by acting on the

12. Kleitman, N.: Sleep and Wakefulness, Chicago, University of Chicago Press, 1939.

13. Sherrington, C. S.: Experiments on the Value of Vascular and Visceral Factors for the Genesis of Emotion, Proc. Roy. Soc. London 66:390, 1899.

14. Taylor, R.: Hunger in the Infant, Am. J. Dis. Child. 14:233 (Oct.) 1917; Hunger and Appetite Secretion of Gastric Juice in Infants' Stomachs, ibid. 14:258 (Oct.) 1917.

15. Ivy, A. C.: Report to the Planning Division, Quartermaster Corps, United States Army, 1945.

16. Consciousness is considered to be a state of discriminative awareness.

cerebrum. It is possible that the drug acts at a lower level, or at the level of the hunger center, or at both the cerebral and hypothalamic levels. In this connection it would be well to know the effect of the drug on the decerebrate hunger activity of the pigeon, dog and monkey. In fact, one interpretation of the food behavior of the dog after the administration of amphetamine would suggest that the drug paralyzes the sense of smell for food. The dog that has received amphetamine is sufficiently interested in food to be jealous when it is being served to other dogs, yet the animal does not eat that which it is served.

In accord with present information, the anorexia-producing effect of amphetamine appears to be quite characteristic of the drug in the dog. The dose which completely prevents caloric intake does not cause obvious excitement, nausea, ataxia or other signs. The anorexia caused by the drug is different from (*a*) that of alcohol, which causes ataxia; (*b*) that of morphine, which causes nausea and sleep; (*c*) that of fever-producing substances, which decrease interest in things in general, and (*d*) that of noneuphoria-producing toxic substances, which cause generalized depression.

Among the various agents which cause anorexia, amphetamine appears to resemble cocaine most closely. However, Grossman and Cummins [17] find that 60 mg. of cocaine hydrochloride are required to cause any anorexia in the dog. This is at least ten times the dose of amphetamine sulfate which would be required.

In the use of amphetamine in the management of obesity the possibility of the development of tolerance must be considered as well as the contraindications. We observed no evidence of habit formation in our subjects.

SUMMARY AND CONCLUSIONS

1. It has been demonstrated by controlled experiments on human and canine subjects that the administration of amphetamine sulfate may cause or facilitate a loss of body weight in obese and nonobese persons.

2. The evidence shows that the loss of weight observed in these experiments was due primarily to a reduction in the intake of food.

3. In a group of 10 subjects who maintained a constant caloric intake for one hundred days the administration of amphetamine sulfate for fifty-six days caused some loss of weight during the first four to eight days in 7 of the subjects. This weight loss was most reasonably attributed to a slight (approximately 10 per cent) increase in energy metabolism due to restlessness, which disappeared on the development of tolerance. No evidence of deleterious effects of the drug was observed.

4. A daily dose of 5 to 10 mg. of amphetamine sulfate injected subcutaneously into dogs (8 to 10 kilograms of body weight) one hour before the presentation of food, which was left in the cage for forty-five minutes, caused a complete abolition of food intake for from ten to twenty-one days in some dogs. This action of the drug was not influenced by extrinsic denervation of the stomach and intestine. We interpret the evidence as an indication that the drug produces anorexia by acting on an appetite mechanism in the cerebrum or on a hunger mechanism resident at a lower level (hypothalamus) or both. Means for testing the validity of this interpretation are suggested.

17. Grossman, M. I., and Cummins, G. M.: Unpublished data.

Clinical Notes, Suggestions and New Instruments

SENSITIVITY TO PENICILLIN RESULTING IN ABSCESS FORMATION

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The reports of sensitivity to penicillin are ubiquitous in the medical literature and may be epitomized in the following manner: Lyons [1] reported such reactions as chills, fever, headache and eosinophilia, while Strazza [2] gave the case history of a patient with delayed sensitization to penicillin, similar to serum sickness. Hailey and Millard [3] reported a similar syndrome. Keefer [4] and Creep [5] reported urticaria. Price, McNairy and White [6] reported a case of asthma. Other toxic manifestations have been thrombophlebitis,[7] bullous dermatitis,[8] gastrointestinal reaction,[9] contact dermatitis [10] and vesicular dermatitis.[11]

The case reported herein is unique in being the first report in the literature of the formation of a sterile abscess as the result of an untoward reaction to penicillin.

REPORT OF CASE

A white man aged 38, a soldier, was in excellent health until Aug. 20, 1945, when there developed a cellulitis of the right hand following a simple friction blister of the right index finger. Treatment consisted of oral sulfadiazine plus 320,000 units of penicillin given intragluteally in interrupted doses over a period of forty-eight hours. Four weeks later abscesses, multifarious in nature, developed at the site of the penicillin injection. These abscesses were treated without the use of chemotherapy.

On Sept. 24, 1945 the patient was wounded in the right lower leg by flying rocks hurled by an exploding shell. He sustained superficial injuries of the soft tissue over the anterior portion of the right lower leg with no involvement of the bone. Treatment consisted of sulfanilamide powder dusted on the surface of the wound. Three weeks later the site of the wound drained spontaneously, and because the attending physicians feared the development of osteomyelitis, 1,040,000 units of penicillin were given in interrupted intragluteal injections. The wound healed, and the patient was discharged from the hospital. Four weeks later multiple abscesses 1.5 cm. in diameter evolved on the right and left buttocks, which were the sites of the previous injections of penicillin. In addition a small furuncle appeared on the right lower leg, several centimeters from the old wound. An unknown dosage of penicillin was again given for five days, intramuscularly, in both buttocks and in the left arm.

All the abscesses healed, but three weeks later the patient returned with several furuncles on the lower part of the right leg and with abscess formation at the site of penicillin injections,

Commander of the Base Hospital, Col. Hervey Porter.
From the Medical Department of the Base Hospital, Selfridge Field.

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2. Strazza, J. A.: Delayed Sensitization to Penicillin Similar to Serum Sickness, J. A. M. A. **130**:1071 (April 20) 1946.
3. Hailey, H. E., and Millard, F. B.: Foreign Protein Reaction from Penicillin, U. S. Nav. M. Bull. **44**:207 (Jan.) 1945.
4. Keefer, C. S.; Place, F. G.; Marshall, E. K.; Lockwood, J. S., and Wood, W. B.: Penicillin in the Treatment of Infections, J. A. M. A. **122**:1217 (Aug. 28) 1943.
5. Creep, L. H.: Allergy to Penicillin, J. A. M. A. **126**:429 (Oct. 14) 1944.
6. Price, D. E.; McNairy, D. J., and White, E. L.: Severe Asthma: Delayed Sensitization to Penicillin, J. A. M. A. **128**:183 (May 19) 1945.
7. Progress with Penicillin, editorial, Lancet **2**:546 (Oct. 30) 1943.
8. Morris, G. E., and Downing, J. G.: Bullous Dermatitis (Dermatitis Medicamentosa) from Penicillin, J. A. M. A. **127**:711 (May 24) 1945.
9. Moore, J. E.; Mahoney, J. F.; Schwartz, W. H.; Sternberg, C. T., and Wood, W. B.: The Treatment of Early Syphilis with Penicillin, J. A. M. A. **126**:67 (Sept. 9) 1944.
10. Pyle, H. D., and Rattner, H.: Contact Dermatitis from Penicillin, Arch. Dermat. & Syph. **50**:326 (Nov.) 1944. Barker, A. N.: Allergic Reactions to Penicillin, Lancet **1**:177 (Feb. 10) 1945.
11. Graves, W. N.; Carpenter, C. C., and Unangst, B. W.: Recurrent Vesicular Eruptions Appearing During Administration of Penicillin, Arch. Dermat. & Syph. **50**:6 (July) 1944.

namely, both buttocks and the left arm. The treatment again consisted of 720,000 units of penicillin given intragluteally in interrupted doses. The patient was discharged three weeks later, after all signs of infection had vanished.

Five weeks after discharge, on Jan. 10, 1946, the patient came to the hospital with multiple abscesses at the former injection sites. These lesions were small, measuring 0.75 cm. in diameter. No penicillin was used at this time, and the abscesses rapidly disappeared.

On March 10, 1946 this man sustained a fracture of the mandible. An unknown dosage of penicillin was injected into the site of the fracture, and penicillin was subsequently used as a mouth wash. The fracture healed without complications. However, on April 13, 1946 a furuncle appeared on the lower part of the right leg. Penicillin, 1.8 million units in divided doses, was given intragluteally; the furuncle promptly disappeared, and the patient was discharged from the hospital on April 25. Twelve days later, on May 6, the patient was readmitted with multiple abscesses at the site of the last injection of penicillin (the buttocks).

Laboratory reports revealed that a culture of material from the furuncle exhibited the growth of Staphylococcus aureus and gram-negative bacilli. The fasting blood sugar level was 88 mg. per hundred cubic centimeters. Urinalysis was negative.

Interrupted injections of penicillin, dosage unknown, were given into the right thigh for a period of five days. The patient was discharged May 18. The patient returned again on July 16, 1946 with multiple abscesses of the right thigh. He was treated with oral sulfadiazine. At this time a sensitivity to penicillin was suspected. Laboratory studies included roentgenograms of the right leg, which failed to show any evidence of osteomyelitis or foreign body; culture from the abscesses on the thigh, which revealed Staph. aureus; a fasting blood sugar level of 98 mg. per hundred cubic centimeters and urinalysis, which proved negative.

The patient was given 160,000 units of penicillin by mistake; it was injected into the left buttock. He was again discharged on August 16. He was readmitted seven days later with multiple abscesses of the left buttock, the site of the former penicillin injection. No chemotherapy was used at this time, and the lesions rapidly healed.

On Nov. 19, 1946 the patient was admitted to the hospital to be studied for possible sensitivity to penicillin. There was no history of sensitization to drugs other than penicillin. Laboratory studies were made, and examination of the blood revealed normal conditions. The blood sugar determination was 83 mg. per hundred cubic centimeters. A blood culture exhibited no growth.

No untoward reaction occurred when 0.5 cc. of a solution of sterile water containing 10,000 units of penicillin was injected intradermally.

Several drops of the same solution, when dropped into the patient's eyes, did not produce conjunctival reddening.

In order to determine without question that the abscess formation was due to penicillin, 200,000 units of penicillin in 3 cc. of sterile water was injected into the left buttock, and 3 cc. of sterile water were injected into the opposite buttock. Some of the penicillin from the same vial was injected into another patient. This patient did not develop an abscess. Cultures taken from the vial of penicillin which was used in this experiment failed to reveal the growth of any organisms.

On Dec. 21, 1946 a sterile abscess developed on the left hip of the patient (site of the test penicillin injection), but there were no signs of an abscess on the right hip (site of the sterile water injection).

COMMENT

The injections of penicillin were received by the patient at many different army hospitals, and it is incredible that the penicillin could have been contaminated with a pyogenic organism in each of these hospitals. Rammelkamp [12] reported that the injection of turpentine into the subcutaneous tissue results in a pyogenic inflammation. It would seem that the tissues of this person are sensitive to penicillin or its impurities and that the tissues' response to the drug is much the same as that witnessed by Rammelkamp after the injection of turpentine into the subcutaneous tissue.

SUMMARY

This case of abscess formation at the site of injection of uncontaminated penicillin is to our knowledge the only case of this kind reported to date in the literature.

12. Rammelkamp, C. H.: Method for Determining the Concentration of Penicillin in Body Fluids and Exudates, Proc. Soc. Exper. Biol. & Med. 51:95 (Oct.) 1942.

ABOLITION OF PAINFUL PHANTOM FOOT BY RESECTION OF THE SENSORY CORTEX

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The phenomenon of painful phantom limb following amputation has yet to be explained, but a possible solution to the therapeutic aspect of the problem was submitted by Gutiérrez-Mahoney [1] in 1944 when he reported the complete disappearance of painful phantom fingers after resection of the hand projection of the sensory cortex. As early as 1911 Head and Holmes [2] had observed a patient whose painless phantom foot vanished after the development of a destructive lesion of the cerebral hemisphere. The purpose of this paper is to report the case of a patient dramatically relieved of an intensely painful phantom foot by resection of the corresponding portion of the postcentral convolution.

REPORT OF CASE

J. T., a white man aged 53, complaining of intense pain and numbness in the left foot, was examined at Charity Hospital in New Orleans and found to have impending gangrene due to peripheral vascular disease. On April 6, 1943 a lumbar sympathectomy was performed on the left side. The circulation was considerably improved, though the patient lost the little toe of the left foot because of gangrene. Later, a sympathectomy was performed on the other side. He continued to complain of numbness and pain, however, and in October 1943 requested that his left leg be amputated. Though the foot was fairly warm, amputation seemed advisable on the basis of the excruciating pain. The left leg was amputated above the knee. The wound healed by first intention, but convalescence was marked by throbbing pain in the stump and the prompt appearance of a painful phantom foot. The patient was discharged from the hospital on Oct. 28, 1943.

The patient was readmitted to the hospital twenty-seven months later on Jan. 21, 1946. During the intervening two years he had been constantly aware of his amputated toes, foot and ankle, which besides being painful were felt to be in a state of extreme plantar flexion. The almost intolerable pain was described as a dull ache which became sharp and intense when the stump was in a dependent position. Often, he experienced a burning sensation on the dorsum of the "foot."

Examination disclosed that the stump was well healed, the scar was freely movable and no neuroma was palpable. However, palpation of the scar was painful and caused a violent clonus of the stump.

On the assumption that the pain was of peripheral origin, the neuroma on the sciatic nerve was resected on Feb. 19, 1946. This procedure did not even temporarily abolish the pain or the phantom.

On March 2, 1946 the members of the neurosurgical staff were consulted in regard to the advisability of a chordotomy. We found the patient to be pleasant and cooperative but preoccupied with his painful phantom limb. As a therapeutic test the patient was given a spinal anesthetic, which resulted in anesthesia and motor paralysis below the level of the fifth

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1. de Gutiérrez-Mahoney, C. G.: The Treatment of Painful Phantom Limb by Removal of Postcentral Cortex, J. Neurosurg. 1:156-162 (March) 1944.

2. Head, H., and Holmes, G.: Sensory Disturbances from Cerebral Lesions, Brain 34:102-254, 1911.

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thoracic segment. The phantom foot disappeared and the pain was relieved for about five minutes, but both returned with such severity that two doses (¼ grain, 15 mg. each) of morphine sulfate were required to quiet the patient. The futility of chordotomy having been reasonably well established, resection of the sensory cortex was advised.

Five weeks later on April 11, 1946 the central sulcus of the right cerebral hemisphere was exposed by reflecting an osteoplastic flap. The anterior and posterior central gyri were identified by stimulation with a faradic current. When the sensory cortex for the leg was stimulated, the patient complained that the phantom foot felt hot; stimulation of the motor cortex for the lower extremity caused the stump to jerk. The portion of the sensory convolution for the leg and foot was excised (gray matter and some white matter). That part of the sensory gyrus on the medial aspect of the hemisphere was included in the dissection. On further electrical stimulation no sensations in the lower extremity could be produced. Before ablation of the cortex was complete the patient announced spontaneously that the phantom foot and the pain had vanished.

On the first postoperative day there was anesthesia to pinprick of the stump extending as high as the greater trochanter laterally, the inguinal ligament anteriorly, the perineum medially and the gluteal fold posteriorly. Two days after operation the patient began to have weakness and jacksonian convulsions involving the left side of the body. When he became stuporous and aphasic, an extradural clot was suspected and the flap was reopened. There was only a moderately sized clot between the dura and the bone flap. There was no intradural clot, but the exposed portion of the brain was found to be bright red from the subpial hemorrhage. The area of resection showed no change. The dura was again closed, and the bone and scalp were replaced. By the ninth postoperative day the patient was free of convulsions, was able to move his left arm and fingers and was regaining ability to talk. Sensation in the left thigh began to return about the fifteenth postoperative day and was complete on the twenty-fourth postoperative day. The hemiplegia had completely disappeared by the eighteenth postoperative day. No sign of the phantom or the pain reappeared, and the patient was discharged from the hospital on the twenty-eighth postoperative day, May 11, 1946.

The patient was examined by one of us on March 6, 1947, eleven months after the operation. Neither the phantom nor the pain had returned. The stump was also painless and nontender. Tactile and pinpoint sensations over the stump were normal. Dr. Harry Morris, orthopedic surgeon, who also examined the patient, reported that the stump was an ideal one in every respect.

Since the operation, incapacitating atrophic arthritis with pain and limitation of motion has developed. Most affected are both shoulders, all fingers, the right knee and right ankle and both temporomandibular joints. Neither hip is involved. Arrangements were made to hospitalize the patient for study and treatment of this new problem.

COMMENT

Our experience and that of Gutiérrez-Mahoney [1] with single cases suggest that the problem of painful phantom limb has been solved, but there is a possibility that this may not be the case. Recently, Horrax [2] performed bilateral resection of the sensory cortex for painful phantom hands and arms. Relief was complete for a few weeks, but the phantoms returned and were as painful as ever. In spite of the fact that his patient was a drug addict and a compensation case, Horrax is satisfied that resection of the sensory cortex will not abolish every phantom limb and has turned his attention to bilateral frontal lobotomy as a possible solution to such problems.

Whereas our experience with resection of the sensory cortex for pain includes 5 consecutive successful cases, only one resection was performed for a painful phantom limb. The other operations were for chronic pain of other types not relieved by chordotomy and sympathectomy. Although all persons who lose an extremity have phantoms,[4] less than 10 per cent have sufficient pain referred to the phantom to require surgical procedures such as revision of the stump [5] and sympathectomy.[6] Consequently, the cases requiring cerebral operations are too few to provide any one surgeon with extensive experience. It is important, therefore, that all cortical resections for painful phantom limbs be reported so that this operation can be correctly evaluated.

SUMMARY

A case is reported in which a painful phantom foot was abolished by surgical excision of the corresponding part of the posterior central gyrus. It is urged that all cerebral operations for phantom limb be reported so that the value of this procedure may be determined.

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PREVENTION OF REACTION TO BAL

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In the treatment of poisoning due to heavy metal with BAL (dimercaprol, or 2,3-dimercaptopropanol) undesirable side effects have been previously noted.[1] These reactions consist chiefly of some of the following symptoms: nausea, vomiting, headache, burning sensation of gums, nose and eyes, profuse lacrimation and salivation, abdominal cramps, flushing of face, tingling of extremities, burning of skin, feeling of constriction of the chest and restlessness. At times these complaints are so severe as to necessitate discontinuance of treatment.

In view of the close resemblance of the severe symptoms which BAL therapy caused in a patient being treated for arsenical dermatitis and hepatitis to those seen in cases of serum sensitivity reactions, 0.6 cc. of a 1:1,000 solution of epinephrine hydrochloride was given intramuscularly. He obtained rapid and complete relief.

Influenced by this response, we gave the patient 25 mg. of ephedrine sulfate by mouth one-half hour before the next injections of BAL in an attempt to prevent a recurrence of the reaction. None of the toxic symptoms were noted after any of the ten subsequent injections of graded doses of 2 to 4.5 cc. of a 10 per cent solution of BAL preceded by an oral dose of ephedrine sulfate.

A second case reaffirmed the foregoing observation. A Negro man with a generalized dermatitis due to a heavy metal was started on BAL therapy after being prepared with ephedrine sulfate, 25 mg., given orally a half hour before each injection. No toxic symptoms were noted. After the sixth injection (dose 4.5 cc.) had been given the 25 mg. ephedrine sulfate was omitted prior to the seventh dose. Within a few minutes the patient noted severe lacrimation, headache, a feeling of constriction in the chest and a burning sensation of the skin of the trunk. The following injections of BAL were preceded by 50 mg. of ephedrine sulfate a half hour before their administration, and none of the previous unpleasant symptoms were experienced.

CONCLUSIONS

Preparation of the patient with ephedrine sulfate shortly before the injection of BAL may lessen the intensity or prevent entirely the side effects of this valuable remedy.

Special Articles

SERMONS DELIVERED AT THE ATLANTIC CITY CENTENNIAL SESSION

THE GOOD PHYSICIAN

MONSIGNOR FULTON J. SHEEN
Washington, D. C.

Whenever a man sits down in a doctor's office both he and the doctor have the right to ask each other the question "What is your philosophy of the universe?" For unless his philosophy is right the doctor cannot be sure that his bill will be paid, and the patient cannot be sure that he will live to have a bill to pay. Before an architect builds a house he wants to know who is to live in it, and before a doctor treats a patient he ought to know whether he is treating a man or an animal.

Because the physician believes in the dignity of man he will never ask himself whether the life before him is valuable but rather will profess that it is sacred, and sacred means inviolable, because God alone is its Giver. Just as in the political order the physician will say that the state cannot take away his liberties because they are the endowment of the Creator, so neither will he take a life because that too has come from the Hands of a Heavenly Father. He will realize that his profession summons him to be the protector, the conserver and the guardian of life—not its destroyer. He will never commit murder, even under the name of euthanasia, for the Fifth Commandment still binds the physician of the world. No man calls in a physician to take a life but rather to see fulfilled in the order of nature what the Divine promised in the order of grace "I am come that you may have life and have it more abundantly."

Because the physician lives in a moral universe he will see that, just as the basis of psychosomatic medicine is the fact that man has a soul as well as a body, so too he will see, in addition to other valid explanations, that in some cases at least the effect of moral guilt on health is not to be discounted. Psychiatry will make greater strides at that moment when it admits a moral as well as a mechanistic universe and begins to see that the denial of guilt is the greatest cause of morbidity in certain types of patients; that the self centered are always the self disrupted; that excessive self expression is self depression, and that what religion calls a sinner is in the psychiatric order a man who is a problem to himself; that the flight from life today through alcoholism, opiates and noise is an indication that no man can live with himself when he has lost all respect for self; that, just as the cock crew when Peter denied Our Saviour, so too nature and the mind protest when man denies his God. What some patients need is not to analyze their attitudes but to confess their guilt; what they need is not sublimation but forgiveness. Relief comes not from having their sins explained away but from having them absolved; and in some cases at least the solution that must not be outlawed is that of the Great Physician Who first told the man his sins were forgiven and then told him to take up his bed and walk.

Because the physician has one of the noblest vocations given to man, namely to minister to the temple wherein Divine Resemblance dwells, he will always maintain a personal relationship with his patients, based on that of service and function, not on profit and gain. He will see that, just as dictatorships arise to organize the chaos created by a loss of personal responsibility, so too will state medicine arise to impose planned service on doctors who have forgotten duties to their patients. State medicine is in the medical order what totalitarianism is in the political order—the forcible imposition of a plan on men who have ceased to serve, love and respect. Dachau was based on a Planned Race; the concentration camps of Russia with their 15 million prisoners are based on Planned Economics; in like manner, the foolish handling of the levers of life will bring not Planned Parenthood but Planned Ruin.

A society that will not allow a man to choose freely the politicians who shall govern him will naturally be a society where he will no longer be free to choose the doctor who will treat him. When doctors oppose state medicine because they cannot make as much money as they do now, then state medicine is inevitable; when doctors oppose state medicine because they want to maintain a personal relationship with their patients, then the compulsory organization of human service is impossible. State medicine can enter the social order only when it batters through the door of the Physician on which is written "I came not to be ministered unto but to minister."

Because a physician believes that man was made for perfect Life and Truth and Love, he will see that the greatest tragedy of life is wasted pain. No man is better just because he suffers. Pain cuts and sears and sours the soul when one can see no purpose in it or if there is no one to love for whom it can be offered. Here is where religion comes to the aid of medicine. Christianity never promised to relieve pain, but it did give a way to transcend and transfigure it by uniting it with One Who after advocating sacrifice took His own medicine on a Cross. After all, what is pain but sacrifice without love, and what is sacrifice but pain with love? Pain may be from sin but not sacrifice. A mother keeps a vigil at the bedside of her sick child: neighbors call it "foolish," she calls it love. Not to believe that our pains can serve another good is to disbelieve in God. If we have blood banks on which the anemic may draw, may we not also have spiritual blood banks on which the morally indigent may draw for their redemption? If we transfuse blood why cannot we transfuse sacrifice, and if we graft skin why cannot we graft prayer? That incidentally is why we have contemplative orders and nursing sisters, to pray and to sacrifice for the weak members of the Mystical Body of Christ that they may be made whole.

The physician, then, who is conscious that he has a vocation as well as a profession will also bring to his patients a Divine Vision. In every aching head he will see a crown of thorns and will strive either to lift it off or to turn it into a garland of roses; every bruised

Excerpts from sermon delivered by Monsignor Fulton J. Sheen of the faculty of the Catholic University of America at the Centennial religious service, Ninety-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 8, 1947.

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hand to him will be pierced with nails, every body will be a Temple of the Holy Spirit and every foot will be the vision of one riven with steel; every ailing heart will remind him of One Who wore His Heart on His Sleeves that all might know a love that was as open as the world. Every mother in labor will remind him of that other Mother who at the foot of the Cross brought forth in the pangs of spiritual childbirth all who are brothers in Christ.

Then when the physician has made his last visit to a sick bed, and the veil of life is torn aside, he shall see the Lord and Master in whose name he labored, and he shall hear from His Lips the pledge of eternal salvation and the beginning of an eternal ecstasy: "I was sick—and you visited Me."

MEDICINE AND RELIGION

Dr. JOSHUA LOTH LIEBMAN
Boston

In the Book of Ecclesiasticus the famous Jewish Apocryphal writer Joshua Ben Sirach penned this immortal tribute to the physician: "Honor a physician with the honor due unto him . . . for the Lord hath created him. For of the Most High cometh healing . . . the skill of the physician shall lift up his head; in the sight of great men he shall be held in admiration."

We men of religion are gathered together this morning to give honor unto the physicians of this land—to pay tribute to the American Medical Association on its hundredth anniversary. We think of the manifold achievements of this great organization in creating new standards of medical education, in fashioning a code of professional ethics that could become the model for all other groups of thinkers and workers in the world, in combating ignorance and superstition, quackery and cultism. Through its superb publications, its Councils on Pharmacy and on Foods, its research work in the laboratories and in countless other areas of attainment the A. M. A. has proved itself to be one of the most vital instruments of social good and human progress in America.

There is a close relationship between religion and medicine. This has been true throughout the ages. Christianity with its compassionate concern with healing has been a superb patron and friend of all the healing arts. In my own Jewish tradition there has been an unbroken thread of interest in the cure of the diseases of life. Most frequently famous rabbis in Jewish history were at the same time practicing physicians combining an absorption in the laws of God with a concrete devotion to the well-being of man. Maimonides, the greatest Jewish philosopher and rabbi of the Middle Ages, was at the same time a distinguished physician; indeed much of his medical writing is astonishingly modern in tone. Religion and medicine at their best are allies in the quest for the good, the healthy, the creative life.

Not that the relationship of religion and of science has not often been a very turbulent one. There have been periods of great estrangement, as it were, between the families of science and religion, and also wise attempts at reconciliation. As so often happens in human affairs, false pride is involved, regrettable attitudes of superiority or contempt both on the part of the laboratory and of the sanctuary. Today at this most dangerous moment in human history religion and science must recognize their interdependence, must learn to transcend old wounds and hurts, to forget what partisans on both sides have regrettably said and done, and recognize that each has much to learn from the other and that there are vital unities which bind them together—a therapeutic intent which may yet heal and save mankind. Prophetic religion and scientific medicine meet in the fact that both of them are built on *faith*, share creative *curiosity* and subordinate themselves to necessary *discipline*. Science calls its faith by the name of assumption or hypothesis, yet often its greatest discoveries are achieved by what the late Walter Cannon called "serendipity," a creative hunch or an intuitive leap into the unknown. Religion calls its faith by the name of doctrine, dogma or belief.

Faith, curiosity, discipline are common both to prophetic religion and to scientific medicine. Obviously there are differences between the two which must not be blurred. Religion must concern itself primarily with the goals and values of life, whereas science concerns itself primarily with the facts and means of life. The interdependence, however, is so inescapable that no rigid barriers can or should be erected between the sanctuary and the laboratory.

There should be a "two-way passage" between medicine and religion. Religion can learn much from the practice as well as the theory of medicine—it can learn the blessings that come to the world through the unfettered use of reason and experimentation, through the attitude of tentativeness and absolute humility before the facts—the attitude that Huxley described in his famous phrase "Sit down before the facts as a little child or you will know nothing." Religion, which often speaks eloquently about the dignity and the value of the individual, can learn much from the way medicine acts concretely in treating the individual person with gentleness, compassion and concern—can learn many indispensable lessons in applied idealism. Medicine can well say to religion "Beware of the arteriosclerosis of dogma and the dangerous bacteria of sectarian pride. Be on guard against every retreat from reason into uncritical and uncriticized faith."

At the same time we of religion can and must say to the spokesman of science "Beware of self complacency and the idolatry of the partial. Do not make the mistake of dismissing all of religion because some of it is primitive, superstitious or untenable. Do not succumb to the genetic fallacy." The doctor by virtue of his absorption in the specific and the concrete oftimes ignores the Wider Context of the universe. Prophetic religion must remind the scientist that the sources of salvation and of healing in the world—the sun, the earth, the food and the herbs of the earth as well as the intellect of man and the instruments fashioned by that intellect—are basically not man's creation. They are made available to us by the Creative Power, God. We today can accept no infantile conception of Deity. At the same time men of science are hopelessly arrogant and tragically parochial when they try to ignore or deny the Creative Power working in and through us, revealing Himself in the restless mind of man and the law-abiding majesty of nature. When we rebel against Him it is after all with His weapons of intellect and of conscience that we revolt; when we try to flee from God it is actually on His created carpet of law and of causality that we escape.

Sermon delivered at the Centennial religious service, Ninety-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 8, 1947.

True, there are fundamental differences between science and religion in area of interest and in universality of outlook. Science stresses tentativeness, analysis and the realm of fact; religion emphasizes commitment, purpose, synthesis and value. Science often can tell us how to get what we want; religion at its noblest reminds us about what we ought to want, giving us an ultimate feeling of relatedness to a Divine Mind and Purpose, a supreme loyalty to the rational good.

At the same time prophetic religion and scientific medicine are bound together by many great ties. We both recognize how frail man is—man a broken reed at times, a bent reed at other times but a "thinking reed" blessed by God with the capacity to reason, to explore, to experiment, to create. Religion and medicine join hands at the moment of birth, the majesty and mystery of new life and also in the poignant hours of death when the thread of existence is severed by the inexorable scissors wielded by the Angel of Death. Religion and medicine in their truest moments are humble in the recognition that the blessings and the healing resources of the universe are not invented by us human beings but discovered and used by us and that whether we admit it or not we are always dependent on the Power greater than ourselves. Finally, religion and medicine are united in a sense of commitment and consecration to the service of life.

SPIRITUAL SIGNIFICANCE OF MEDICINE

At this time of the celebration of the hundredth anniversary of the American Medical Association it is fitting and proper for us to reflect on the spiritual and psychologic significance of medicine in this time of crisis, to consider the dangers ahead and also the tasks ahead.

What is the spiritual and psychologic significance of medicine? I see it in three dimensions: as hope for human life, as the symbol of progress, as the moral challenge to the nations of the earth. I see medicine as the Attorney for the Defense of man, as the antidote to despair and pessimism in our age—a pessimism reflected in the poetry of an Auden, the Existentialism of a Sartre, the novels of a Kafka. The doctor knows all of the evils and brutalities of life, but he is the eternal champion of Eros against Thanatos, the life-wish against the death-wish. Medicine carries on a constant warfare with germs and bacteria, virus infections and degenerative diseases. The High Command of medicine is to be found in the laboratory amidst the retorts and the test tubes; its line officers are to be found in every hospital and clinic working to conquer new territory for the kingdom of life. Let us listen to no premature elegies for our human species, for medicine by its deeds is the spokesman of hope, proving that man is something more than self centered and selfish, that there is an altruistic component in the human heart and that human nature is capable of rationality, objective analysis and a continuing conquest of the enemies of human survival, both external and internal. The doctor is the symbol of man as the doer, the searcher, the life giver.

Medicine, in the second place, is a symbol of progress. Carl Binger in his provocative work "The Doctor's Job" makes very vivid this truth of progress which we tend to overlook in our skeptical age. Just fifty years ago there was no x-ray, no Wassermann test; vitamins were unheard of; typhoid and diphtheria were still an enormous menace; there was no radium. What undreamed of vistas of achievement scientific medicine has opened up within these last few decades! Realistically we dare to hope for a time when cancer will go the way of typhoid, when many of the degenerative diseases will come under the control of man as tetanus has come under his control. A generation that has discovered penicillin and sulfanilamide and that now has at its disposal radioactive substances unheard of ten years ago can find in medicine the antibiotic to human despair, the assurance of human progress.

There are many new frontiers for medicine in the conquest both of physical and of mental disease. Psychosomatic medicine is one of those great new frontiers. It is imbued with the spirit of Paracelsus, "He who wants to know man must look upon him as a whole." The spirit of psychosomatic medicine is quite close to that of the religion of Judaism, which always looked on man as an interwoven unity of body and soul, . . . convinced that it is impossible to tell where the body ends and the soul begins. Religion and medicine must both become concerned with the whole man today. It is no secret that in our tense and complex age millions of human beings are suffering not only from dislocated bones but from dislocated emotions, minds and souls. The war has educated all of us to the enormous role that emotions play in the psychic economy of the world. Indeed, until men learn how to manage their emotional life artistically there will be neither peace nor justice in the world at large, nor health and tranquillity in the organism at home. The words of Shakespeare "Anger's my meat; I sup upon myself and so shall starve with feeding" apply in one degree or another to multitudes everywhere. Anger or hate, grief or loneliness are the meat of life for millions of uncertain, frustrated human personalities; many do sup upon themselves and starve themselves into asthma and hypertension and many of the other ills that flesh is heir to.

As psychosomatic medicine and group therapy advance and thousands of doctors become trained in the newest insights of psychiatry and psychoanalysis we shall learn how to cure these "toothaches in the heart" of man—the toothache of repressed anger, frozen love, congealed emotion, embittered cruelty—learn also to take away many of the pains of inner conflict and to sew together with the surgical needle of the understanding mind the gaping and open wounds that life inflicts upon us all. Such a medicine will parallel the great strivings of religion at its best to make man mature, integrated, inwardly tolerant, free of corrosive self contempt, liberated from the inner Egypts of cruelty and callousness and able through such emotional maturity and psychic independence to become a genuine co-worker and collaborator with God. Medicine not speculating about the *problem of evil* but working restlessly with the *evil of problems* is today truly a symbol of human progress.

In the third place medicine is a moral challenge to the nations of the world. It looks on sick men not in order to condemn them but to understand and to cure them. So should we look on sick nations in the world. The therapeutic intent of medicine which has worked miracles should become the therapeutic intent of statesmanship. Furthermore there are no narrow national sovereignties in the discoveries of the medical clinic. In medicine there truly is "one world." There just is no Chinese insulin or American penicillin. There is the same insulin and the same penicillin for the human family everywhere. Furthermore there can be

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no real isolation in science because its truth can be verified only by being shared. Doctors trained and molded by the tradition of their profession have learned the art of cooperation, seeing that truth yields up its secrets only through collaborative team work. There is a universality about the healing process which applies equally well in China or Russia, Britain or America; there are no frontiers dividing truth from truth. What medicine has been able to achieve it has done through the free intellect, the boundaryless laboratory, the creative interchange of ideas, the humble sharing and cooperative interrelationship of men of all nations, races and creeds. Medicine is William James's "moral equivalent for war" . . . it is the sublimation of selfishness and self centeredness into an immortal and worldwide quest and attainment of healing truth. The nations of the world can learn a moral lesson from medicine—that just as the healing drugs of one city or one nation know no limited sovereignty but are to be made available to the human family everywhere, so the healing laws of peace and order must apply everywhere under world sovereignty and world government.

THE DANGERS AHEAD

There are enormous dangers ahead for religion and for medicine; the danger of religion succumbing to a rigid dogmatism or a pride in the vested interest of ideas inherited from the past; of medicine succumbing to an idolatry of its own technics, a worship of a part of life as the whole of life, a blind unwillingness to see the wider context of Divinity in the world. There are dangers that confront the whole human enterprise. The world is going to have to become better than it has ever been or there will be no world. Many of the luxuries we have afforded in the past we can afford no longer—the luxury of prejudice, hatred and war. The choice is really before us; *will it be the isotopes of healing or the radioactivity of death?* If humanity cannot take a lesson from the pages of medical science, of compassionate and courageous doctors concerned not with death but with life, then we and our children do not deserve to survive.

THE TASKS

There are not only great dangers but great tasks ahead. In the increasingly interdependent society of our age we are going to have to plan for abundance, for health, for equality. The basic question is whether it is going to be voluntary planning or compulsory planning. The medical profession in the degree that it wishes to avert and to avoid coercion from without will certainly have the wisdom to plan voluntarily for adequate treatment of all Americans irrespective of status or class. A democratized medicine, like a democratized religion, is one of the prerequisites of our vast industrial society. We need new insights today into the enormous influence of a frustrating environment and all of the traumas of unemployment and poverty and ruthless economic competitiveness on the plastic material of the human spirit. We need doctors and religionists filled with the spirit of the American poet Walt Whitman: "I know that all men ever born are my brothers . . . in all people I see myself. . . . I will not have a single person slighted or left away. . . . I do not ask the wounded person how he feels. . . . I myself become the wounded person. Behold I do not give lectures or a little charity. When I give, I give myself. Whoever degrades another degrades me. . . . By God, I will accept nothing which all cannot have their counterpart of on the same terms."

This is the spirit which animates the true physician. In his feeling of relatedness and concern for his patient the doctor does not give lectures or a little charity, he gives himself. He has a kind of empathy which makes him feel his essential oneness with the suffering and sensitive human family.

The equality and brotherhood of mankind which both religion and medicine proclaim are made vivid in a remarkable passage from an ancient Hebrew manuscript. An old rabbi asks the question "How can we love the Lord our God with all our heart and soul and might when we can never see God, the invisible spirit of the universe? We can love God best by loving His letters best. Just as a child learns the alphabet one letter at a time and then combines the letters into words and the words into sentences until at last he is able to read a book, so should we regard every human being as but one letter in the alphabet of God. The more letters we come to understand and to treasure, the more we can read the Book of God and love its Author."

That ancient rabbi teaches us that the true meaning of life is to be found in this test: "Man, do you by your cruelty or callousness blur the letters of God or even erase them, or do you by your compassion learn to treasure the letters of God, your fellow human beings?"

This magnificent parable from Jewish literature certainly applies to medicine and to religion in the world of today. Some wonderful human letters are blurred by bigotry and even erased by discrimination. Religion, if it means anything in human life, must battle ceaselessly against walls and bricks of prejudice, and the medical profession must learn to demolish all barriers and obstacles placed in the way of human talent, frustrated and denied educational fruition because of color or race or creed.

Religion when true to its prophetic heritage does treasure the letters of God by investing every man with dignity as a child of the Divine. We also know that the surgeon, the doctor, the psychiatrist polishes and preserves the consonants of divinity—human beings, men, women and children—by making these letters glow luminously with health, integration, maturity. Religion and medicine must both come to value every person on earth as an equal consonant in the vocabulary of Divinity.

It is characteristic of prophetic religion that it emphasizes the Messianic dream—the hope of a world redeemed from evil and purged of iniquity and freed of all the barnacles of pain and disease, a world that will become one as God is one. How far we still are from that Messianic Kingdom! We who live in this twentieth century recognize that there are no absolute answers but only partial victories; yet these victories are good omens of a nobler and freer future when the letters of God on earth will not be blurred but rather will be burnished with love and with understanding. The laboratory and the sanctuary can become allies and creative partners in helping to bring a little nearer that age of the Divine, by learning to work together with mutual respect, mastering together the new secrets of nature and of human nature, laboring together in the words of an ancient Hebrew hope and prayer "for the blessing of all and the hurt of none, for the joy of all and the woe of none."

Amen.

CAESAR, GOD AND MEDICINE

Rev. RALPH COOPER HUTCHISON
Easton, Pa.

The absurd paradox of this era is constituted by the prodigious achievements of medicine on the one hand and the destructive fury of war on the other. That such miracles should be performed in the alleviation of human suffering and the preservation of life while war spreads disease and death is a fateful coincidence that deserves deep study and thought. To the physician or surgeon who exerts all of his skill and strength for the preservation of some precious life, it must be ironic to realize that within our own time two nations, Russia and Germany, have each planned deliberately and carried through successfully the tortured destruction of an estimated five million of their own finest citizens. Add to this the smaller slaughters in smaller nations and then the crippling, the diseasing, the maiming, the blinding and the killing of an incalculable number in history's two greatest wars, and medicine's mighty effort is dwarfed in comparison.

War, I think, should be recognized by the medical profession as humanity's worst disease. With world inclusive precision it systematically destroys life. It maims, it blinds, it disfigures. It starves whole peoples and leaves them subject to the disease which follows undernourishment. In a day it destroys the sanitary and health facilities created by the labors of a generation. Taking men of the finest health it places them in prison camp and slave labor subject to the primitive ravages of every disease known. And it reaches to their minds and destroys the faith and hope and sanity on which health must be based.

This disease of war is more widespread than our hospitals and our health measures. It literally covers the face of the earth. Its force is inexhaustible. At times and most of the time it is supported by more governmental funds in a few weeks than has medicine been given in all modern history. It commands the devotion and efforts of more men in one generation than have served medicine in all recorded history.

War is the arch enemy of medicine and of civilization. International war must be stopped and its increasing cadence must be retarded or the magnificent achievements of medicine will come to a brutal futility. The ghastly dichotomy of medicine on one hand and war on the other cannot go on forever. One must triumph—either medicine and civilization or war and barbarism.

If there is any profession in the world to whom the outcome of this struggle is vital, it is to yours. If any sermon is to be preached to medicine, it is this for the preservation of the life and health of mankind.

I

International war can be stopped, but not by the methods which we have used since 1914. These methods give priority to negotiation, arbitration, treaties, compromises and appeasement. They are sincere and even scholarly attempts to eliminate war by eliminating the causes of war. But at the same time they deliberately avoid the issue of war itself. They are expedients by which leading and democratic nations evade their own lonely responsibility of stopping this worst disease of history.

Far from the madding crowd of statesmen, politicians and diplomats and within this group isolated in its practical science let us review this problem reasonably. When a criminal maniac breaks loose and begins to slaughter people, we do not call a conference to study the social and hereditary factors out of which developed his murderous fury. Nor do we begin delicate negotiations with him. Nor do we strive to appease him. We stop him dead in his tracks by any means possible. After he is stopped we return to the conference table and the research problem to devise methods by which the development of such criminals may be prevented in the social order.

In the world of international relations this is exactly what we have refused to do since 1914. Through courts of international justice, through treaties, concessions and appeasements, through leagues of nations of one kind or another we have striven to eliminate the conditions out of which rise wars. And under cover of these benevolent measures we have excused ourselves and evaded our responsibility to stop war. While afraid to go out and stop the criminal we have rationalized our cowardice by vigorous debates on the cause and cure of crime.

We could have prevented this last world war. We know that now. Had we or England or France sent one squadron in that direction when a rebellious Japanese army invaded Manchuria, had one regiment been moved when China was invaded, had one nation showed fight when Italy invaded Ethiopia, had one democracy strapped on its arms when Germany and Italy invaded Spain, had any nation started to move its forces when Hitler marched into the Rhineland, that developing world war would never have started. It could have been decisively and easily stopped at any of those points. But the democracies were afraid to lead out and to stop war.

International war has been stopped before when great democracies chose to do so. Two brilliant pages in history record those achievements, and both came when nations were willing to assume responsibility. The first and the greatest perhaps in all history was under the leadership of Jefferson, Madison and Monroe, when the then little nation composed of these states decided to stop for all time any international European war on this continent. They did not do so by leagues, appeasements or treaties. They simply stopped war. They announced to the world that European wars on this continent were all over, that there would be no more. And, small and weak as they were, they meant it—and incidentally we still mean it. And European international war on this continent was stopped forever.

It was done another time. This was in the Pax Brittanica, the hundred years of international peace from 1815 to 1914 enforced by Britain for its own purposes. No wars were permitted save trifling ones to which it had no objection. Had the German navy not grown strong enough to challenge the British navy, no one knows how long that peace might have been further maintained by Great Britain.

Now, America can prevent all international war. We have the strength and position. We can if we will step out and proclaim an imperialism of peace and freedom. We can announce that every nation is to stay within its own borders and that, whenever one force invades or attacks another for purposes of con-

Abstract of the sermon which Rev. Ralph Cooper Hutchison, president of Lafayette College, Easton, Pa., delivered at the Centennial religious service, Ninety-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 8, 1947.

quest, we will loose everything that we have from funds to bombs to stop that attack or that invasion. We cannot solve all of the problems of the world. We cannot bring justice between nations. We cannot assure economic fair play. These may in time be achieved by the United Nations. But we can stop war and, if we will stop war, then the forces of civilization may do their work and eventually eliminate the causes of war.

II

The immediate reaction to this is that such a problem is a political one, that men of the medical world must do their own highly specialized work and that this must be cared for by the statesmen and the politicians. The suggestion that the medical profession should do something about a political problem is open to considerable debate. But that medical men should do something about this and other political and religious problems, I wish to urge.

One of the major problems of democracy has developed in this age of high specialization and lies in the failure of highly trained specialists to take their part in democracy and in religion. The first deals with the organization of men. The second deals with their driving motives and convictions, and both fail unless the ablest and most mature minds participate in full force. The specialist, the scientist, the engineer and the physician are now taking the position that they must carry on their own significant work and must leave government and religion both to the professionals within those fields. As a result, the nonparticipation of medical men in the responsible work of both church and state is notorious.

The reasons for this are understandable. It might seem wrong that one so highly trained and superbly equipped as for medicine should allow any time or strength for church or government. This hard acquired skill, this priceless knowledge needs its fullest use in the saving of health and life. Furthermore, the very narrowness of medical education and its complete concentration on the scientific leaves the medical man feeling unqualified for active participation in the fields of religion and government. Humanistic studies having to do with the basic problems of human relations and with the thinking and motives of men—such studies are almost totally excluded from the college and professional education of medical men. Thus the medical profession, confident in the field of its own skill, hesitant in politics and religion, resolves to let others carry these social responsibilities.

But, curiously enough, neither democracy nor religion can function if left to mercies of their own professionals. Their problems are universal. They affect every man, woman and child. They affect every aspect of man's welfare, of his thinking and of his conscious existence. The problems are too great for any one group. The rich cross breeding of thought and the broad strength of men of great skills and knowledge in other areas are needed in these. Democracy will not survive if you who are the specialists do not share the labors of democracy. It cannot stand and fight for human rights if the specialists of our era remain in their laboratories, in their shops, in their hospitals and clinics and studies. We cannot win in democracy and for democracy if our increasing army of specialists fails to take its share in our social and international tasks.

Many old battles have now to be fought again. We thought that certain victories had been won. There is this battle for peace which we once thought was won. There is the battle against barbarism which must be fought anew. There is the issue of human slavery, which has returned like a plague over the earth. There is the great issue of religious liberty, now denied in nation after nation. There is the struggle to maintain a Christian civilization and the Christian ideal in life.

And there is a time when the preacher must lay aside his Book, the lawyer his gown, the teacher his rule and go out and share the human task of religion and government. By that same token there must be times when the new scientist of this day must aid, when the engineer must lay aside his plans, the technologist his microscope, the surgeon his gown and take full part in the task of Christian civilization.

Perhaps the words of Christ could, this day, have a special meaning for the medical profession, a meaning not quite what he intended when he said

Render, therefore, unto Caesar the things that are Caesar's and unto God the things that are God's.

Council on Pharmacy and Chemistry

REPORT OF THE COUNCIL

The Council has authorized publication of the following statement.

AUSTIN SMITH, M.D., *Secretary.*

METHADON, GENERIC TERM FOR 6-DIMETHYLAMINO-4,4-DIPHENYL-3-HEPTANONE

In view of the fact that the term Amidone, which has been applied to the chemical 6-dimethylamino-4,4-diphenyl-3-heptanone, seems to have proprietary restriction, the Council in cooperation with several interested pharmaceutical manufacturers and investigators gave consideration to the coining of a generic or nonproprietary name for the compound. Various proposals were received from those concerned, and eventually the term Methadon was agreed on.

As a result of the foregoing consideration the Council voted to recognize the word Methadon as the generic designation for 6-dimethylamino-4,4-diphenyl-3-heptanone.

NEW AND NONOFFICIAL REMEDIES

The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

AUSTIN SMITH, M.D., *Secretary.*

BISMUTH AND POTASSIUM TARTRATE (See New and Nonofficial Remedies, 1946, p. 250).

The following dosage form has been accepted:

BREWER & COMPANY, INC., WORCESTER, MASS.

Bismuth and Potassium Tartrate: 2 cc. ampuls. Each ampul contains bismuth potassium tartrate 50 mg. with benzyl alcohol 0.04 Gm.

ESTROGENIC SUBSTANCES (WATER SOLUBLE) (See New and Nonofficial Remedies, 1946, p. 447).

The following additional dosage form has been accepted:

AYERST, MCKENNA & HARRISON, LTD., NEW YORK

Tablets Premarin: 2.5 mg.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, AUGUST 23, 1947

HOSPITALS AND THE GENERAL PRACTITIONER

At the centennial meeting in June in Atlantic City the Council on Medical Education and Hospitals presented a supplementary report to the House of Delegates reviewing the policy of the Council, of the Advisory Board for Medical Specialties and of the House of Delegates on the appointment of general practitioners to hospital staffs. The Board of Trustees requested that copies of this report be transmitted to the various hospital associations and to each hospital registered by the Council, and that is being done this week in accordance with the Board's request.

This report of the Council [1] takes note of the fact that certain hospitals have established a policy of limiting staff appointments to physicians who are certified by specialty boards or who hold memberships in certain special societies. The report emphasizes that such a policy is contrary to the principles of the Council on Medical Education and Hospitals and appears unsound.

The Council's statement points out that the House of Delegates in 1946 approved a resolution encouraging hospitals to establish general practitioner services and specifically stating that the creation of general practitioner services would not prevent hospitals from being approved for the training of interns or residents.

To clarify this action further the Council requested authority to amend that section of "Essentials of a Registered Hospital" which deals with the establishment of staff sections so as to include specific mention of general practice sections. This amendment was approved by the House of Delegates and the amended "Essentials of a Registered Hospital" is being distributed with the reprints of the supplementary report.

The Council's report and its endorsement by the House of Delegates should make clear beyond question to the boards of trustees and directors of hospitals that any rule barring a physician from staff privileges because he does not possess a certificate from one of the specialty boards or membership in a special society is not in accord with the expressed policy of the American Medical Association and the Advisory Board for Medical Specialties. Hospital staff appointments should depend on the qualifications of physicians to render proper care to patients as judged by the professional staff of the hospital and not on certification or special society membership.

No fixed views exist at present as to what regulations should be established for general practice sections or for the activities of general practitioners in other hospital sections. This is a problem in which local conditions must be carefully weighed and the results of intelligently planned experiments studied. Clear thinking and unselfishness on the part of both specialists and general practitioners will be needed in devising workable programs.

In general it would seem reasonable that general practitioners should be extended privileges in the various departments of a hospital in accordance with their personal ability as judged by the heads of the different sections or by a committee of the staff. A paper on how a general practice section has operated over a period of eight years in one large general hospital was recently published in THE JOURNAL.[2] Reprints of this article are being distributed with the supplementary report.

Those most concerned that adequate provisions be made to preserve access to hospitals for general practitioners realize that in many instances university hospitals or institutions designed for special purposes may not be able to establish general practice sections. Such hospitals, however, account for only a small fraction of the total hospital beds in this country.

It is likewise accepted that preserving a place on hospital staffs for general practitioners is not a disavowal of the efforts of physicians, administrators and trustees to make our hospitals centers for providing the highest quality of medical care. The objective is to prevent competent physicians from being denied for arbitrary, unsound reasons the right to practice medicine in hospitals. The extension of staff membership to qualified general practitioners should serve as a stimulus to every general practitioner to maintain the quality of his work at the highest level.

The statement of the Council and the action of the House of Delegates should have a beneficial effect in restoring balance and clear thinking to a situation which has become distorted and confused in several regions in this country.

1. Supplementary Report of Council on Medical Education and Hospitals, J. A. M. A. 134:711 (June 21) 1947.

2. Miller, M. H.: General Practice in a Large Hospital, J. A. M. A. 134:15 (May 3) 1947.

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IMMUNITY IN SYPHILIS

A new approach toward understanding the nature of immunity in syphilis will be possible, according to Urbach and Beerman,[1] if further study confirms the preliminary demonstration of complete sterilization by penicillin therapy of animals experimentally infected with syphilis and of syphilitic pregnant women. Human beings do not possess natural resistance to syphilis. Immunity to syphilis develops in man as a result of syphilitic infection. The development is gradual and never proceeds as far as that of most of the other immune reactions of human beings. Experiments demonstrate that syphilitic immunity in susceptible animals develops slowly. During the early phase of the infection the untreated rabbits are wholly receptive to a second infection. After the ninetieth day there is evidence of partial immunity, so that the animals no longer develop chancres in response to reinoculation. Where the infection is eradicated by drug therapy before any immunity has had time to develop, that is, in the early stages, the animals react with formation of chancre when reinfected, because the intensive treatment in the early stages of infection serves to check the invader and thus indirectly prevents the development of active immunization; the latter can arise only in a thoroughly infected body. Energetic treatment in the late stages will protect the animals against reinfection.

Chesney [2] believes that animals treated in the late stages are biologically cured and at the same time actively immunized because they were thoroughly infected for a sufficiently long time. Kolle denies that these animals have really been cleared of the infection, claiming that they harbor an asymptomatic superinfection as shown by positive lymph node or organ transfer test if performed a sufficiently long time after the last administration of chemotherapy. Since penicillin can apparently effect a speedy cure of syphilis and is at the same time rapidly eliminated from the organism, future experiments might be tried with the aid of this new spirocheticidal agent. The reinoculation test, according to Urbach and Beerman, can hardly constitute a reliable criterion of cure in treated animals. We can only depend on the infectivity of tissues removed from treated animals at appropriate intervals after cessation of treatment and inoculated into normal animals.

Immunity in a syphilitic person is never at any stage of the disease absolute but only relative. Therefore the idea of achieving active immunization in syphilitic persons by administering virulent spirochetes must be discarded; any such attempts are likely to be dangerous. Untreated infection with syphilis confers on the human being immunity which prevents natural superinfection but does not protect against massive artificial superinfection. This immunity is not strong enough to defend the organism against recurrent blood borne thrusts of the primary infection. Intensive treatment of early syphilis is in all probability capable of curing the disease. While such treatment simultaneously abolishes all immunity that is in the process of developing, it does not endanger the patient if it is strong enough to eradicate the infection completely. But if antisyphilitic therapy is inadequate to sterilize the body, the organism's natural defensive mechanism will be seriously impaired. This means that the patient is left both without cure and without defense, a situation often leading to neurorecurrences, therapy resistant cutaneous relapses and precocious tertiarism. A patient may be completely cured and yet remain refractory to natural reinfection. Even in patients treated early, reinfection does not necessarily mean that the first infection has been completely eradicated; theoretically, at least, superinfection may have occurred because, as Moore [3] points out, adequate methods of differentiating between the two are not available.

Chesney likewise stresses that a small amount of treatment in early syphilis is worse than none because it interferes with the body's own defensive mechanism, while at the same time it often fails to eliminate the infection. It leaves the patient worse off than nature alone would have left him and is therefore to be condemned.

Urbach and Beerman regard immunity as a special aspect of allergy. The entire course of syphilis may be explained on the basis of allergy. The reaction of the organism to reinfection also suggests an allergic mechanism. Thus Chesney points out that the destructive character of tertiary lesions is due to the fact that the body has changed its way of reacting toward the spirochetes and now behaves in a much more violent fashion. It has become hypersensitive or allergic, which is another way of saying that a small charge of spirochetes is now capable of setting off a considerable explosion of tissue reaction. Attempts to develop a method to determine the allergic state of a syphilitic individual have thus far been unsuccessful. Details of the mechanism of the defensive reaction against syphilis are still unknown. It is definitely not humoral but is probably a tissue or cellular reaction. The existence of antibodies against syphilis has not been demonstrated. The relationship of the positive serologic reaction to the organism's capacity to produce antibodies against spirochetes is not clear, and numerous attempts to induce active or passive immunization against syphilis in man and animals have to date failed to produce any significant results.

1. Urbach, Erich, and Beerman, Herman: The Present Status of Immunity and Allergy in Syphilis, Am. J. Syph., Gonor. & Ven. Dis. **31**: 192 (March) 1947.

2. Chesney, A. M.: Syphilis as a Problem in Immunity, South. M. J. **29**: 1230 (Dec.) 1936.

3. Moore, J. E.: The Changing Concept of Reinfection with Syphilis and Its Applicability as a Criterion of Cure, Am. J. Syph., Gonor. & Ven. Dis. **29**: 474 (July) 1945.

Current Comment

CONTROL OF INTERFERENCE CAUSED BY DIATHERMY EQUIPMENT

More than ten years ago the Federal Communications Commission was requested by radio communication agencies to formulate regulations to control the interference caused by diathermy equipment. On May 9 1947 the commission released Public Notice number 7722, which document assigned three frequency channels for medical diathermy. The channels are 13.66, 27.33 and 40.98 megacycles in arithmetic progression and correspond to wavelengths of 22, 11 and 7½ meters, respectively, in harmonic progression. The widths of the channels are approximately 15, 320 and 40 kilocycles. Radiations from frequencies other than those specified shall be suppressed so that radiation does not exceed a strength of 25 microvolts per meter at a distance of a thousand feet or more from the diathermy equipment causing such radiation The commission pointed out two methods for operating diathermy apparatus in order to comply with these rules for equipment manufactured after July 1, 1947. The first method is to operate within assigned frequency bands using equipment either "type approved" or certified by a competent engineer. The second method is to operate on any frequency, provided the equipment is enclosed in a shielded room with a filtered power supply and that all radiation on any frequency is limited to 15 microvolts per meter at a distance of 1,000 feet or more from the diathermy equipment. Operation in this manner also requires certification by a competent engineer. A physician owning and operating a diathermy apparatus manufactured prior to July 1, 1947 may continue to operate for a period of five years, provided the equipment does not interfere with authorized radio services. If interference is reported, the physician is responsible for eliminating the disturbance to radio communications. This may be accomplished in some instances by readjusting the existing diathermy appliance. If no means can be provided to eliminate the interference, the physician becomes subject to the new rules and regulations. That is, he must screen his present apparatus or acquire frequency controlled equipment. The channel 2,450 megacycles has been assigned, corresponding roughly to 12.2 cm. wavelength. A channel in the neighborhood of 6 megacycles will be announced later Frequencies of 915, 5,850, 10,600 and 18,000 megacycles have also been allocated for industrial, scientific and medical use. At present the commission has not found it necessary to make any rules applicable to surgical diathermy. The medical profession and the manufacturers of diathermy apparatus are to be congratulated on the successful cooperation with the Federal Communications Commission and the representatives of radio industries on reaching a solution of this perplexing problem in the field of radio communications and diathermy.

CONTROL OF VITAMIN D MILK

In 1933 the Council on Foods and Nutrition for the first time granted acceptance to bottled fresh milk fortified with vitamin D. Since then the number of dairies that have applied to the Council for such consideration is legion. In order for dairies to secure the Seal of Acceptance of the Council they are required to declare on their label or bottle caps the source and unitage of vitamin D and must have their advertising copy approved by the Council. In addition, at least twice yearly, proof must be submitted to the Council in the form of bioassay reports attesting that the milk has been assayed by a reputable laboratory and found to be up to the required potency of 400 units of vitamin D per quart. While a large number of concerns that sell vitamin D milk employ the Council's Seal and abide by the regulations set forth, purveyors of vitamin D concentrates sometimes sell their wares without mentioning the need for routine control to assure the physician and the lay public that proper potency is being maintained. Unless state, municipal or Council regulations require periodic checkups for the vitamin D content of milks, none, apparently, are made. Such large cities as Chicago, Cleveland, Detroit, St. Louis and New York require frequent tests. So far only five states have regulations governing vitamin D milk and have made provision for testing such milks biologically. They are Connecticut, New York, Kentucky, Virginia and Wisconsin. In view of the fact that vitamin D milks are now depended on by physicians to supply vitamin D, it might be well for doctors to inquire of their local or state health departments as to whether or not such milks are subjected to routine control and whether or not such regulations exist for the protection of the public and the medical profession.

THE LATEST REVISION OF THE UNITED STATES PHARMACOPEIA

The thirteenth revision of the United States Pharmacopeia has been published and is now available for all who are interested in official standards and rational drug therapy. This revision became official in the United States on April 1, 1947. Indispensable to pharmacists, drug manufacturers, teachers of medical students and many others, it serves also as an interesting guide to changes in therapeutics. Now revised every five years, the United States Pharmacopeia includes in each revision new monographs, omits others, and in general provides a reference source that should be familiar and handy to the entire medical profession. The letters "U. S. P." inspire confidence in drugs to which they are appended; they indicate a degree of standardization that is acclaimed the world over. An example of such wide recognition is the fact that the book is also official in several Latin-American countries. The present edition is especially worthy of commendation. Those who participated in its preparation have a good reason to be proud of a job well done.

ORGANIZATION SECTION

Official Notes

MIDWINTER (SUPPLEMENTAL) SESSION OF AMERICAN MEDICAL ASSOCIATION

After careful investigation of the availability of accommodations for a midwinter (supplemental) session of the American Medical Association in the short time at its disposal, the Board of Trustees selected Cleveland as the place of that session, since the accommodations for meeting places and for sleeping rooms seemed to be adequate and a convenient time seemed to be open. The midwinter session will therefore be held in Cleveland, Jan. 5 to 8, 1948, the first two days being devoted to a session of the House of Delegates and January 7 and 8 to General Scientific Meetings devoted exclusively to the general practitioner.

The Scientific Meetings, the Scientific Exhibit and the Technical Exposition will be housed in the Cleveland Auditorium, but the place of meeting for the House of Delegates has not yet been selected. The Council on Scientific Assembly, in cooperation with the Board of Trustees, will prepare the program for the Scientific Meetings.

Information concerning hotel reservations will be published as soon as arrangements concerning this matter have been completed.

ANNUAL CONFERENCE OF SECRETARIES AND EDITORS

The Board of Trustees has selected Nov. 7 and 8, 1947 as the time for the Annual Conference of Secretaries and Editors, which will be held at the headquarters in Chicago, starting at 10 a. m., Friday, November 7. The program for this conference will be announced at a later time.

Washington Letter

(From a Special Correspondent)

Aug. 20, 1947.

Compton Says President Was Poorly Advised on Science Bill

Karl T. Compton, president of the Massachusetts Institute of Technology, declared President Truman was "poorly advised" in vetoing the National Science Foundation. Commented Dr. Compton "Practically every one agrees that the universities and colleges cannot contribute their part in meeting the postwar scientific needs of the country on their prewar basis of financial support. Every one knows that national security and prosperity require assiduous attention to science and the training of scientists. I believe the President was poorly advised in this action. I believe the value to the nation of getting the program going promptly outweighs the objections to the form of the bill, which could be corrected later, if in practice they proved serious."

Major General Hawley Expected to Head Veterans Administration

Major Gen. Paul R. Hawley, medical director of the Veterans Administration, is expected to succeed Gen. Omar N. Bradley as head of the Veterans Administration when Bradley reportedly will leave the agency in sixty days to became army chief of staff. He is now on a tour of army installations in Europe. Others mentioned are Major Gen. Lewis B. Hershey, former Selective Service chief, and Major Gen. Harry K. Vaughan, personal military aide to the president. As reasons for which Hawley is favored are his success in medicine and as an administrator under Bradley, his success as head of army medical service under combat conditions in Europe, his experience with enlisted men and veterans and reported presidential fears that General Vaughan's appointment might be opposed in the Senate by political opponents. Dr. Hawley is reported to be General Bradley's choice for the post.

European Women Visit Institute of Health

Among six European professional women who were guests at the National Institute of Health at Bethesda during a Washington stopover on their trip to the conference of the International Federation of University Women in Toronto were Miss Regine Aernouts, head pharmacist of St. Elizabeth Hospital, Antwerp, Belgium; Miss Tine Quist, pharmacist at Leiden University and Dr. Marguerite Steiger, chemist in a Zurich laboratory.

Coming Medical Meetings

American Academy of Ophthalmology and Otolaryngology, Chicago, Palmer House, Oct. 12-17. Dr. W. L. Benedict, 102 Second Ave. S.W., Rochester, Minn., Secretary.

American Anti-Arthritis Association, Del Mar, Calif., Oct. 4-5. Dr. Robert T. Pottenger, 65 N. Madison Ave., Pasadena, Calif., Secretary.

American Association of Medical Record Librarians, New York, Hotel Commodore, Sept. 7-12. Mrs. Adaline Hayden, 18 E. Division St., Chicago, Executive Secretary.

American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Hot Springs, Va., The Homestead, Sept. 4-6. Dr. James R. Bloss, 418 Eleventh St., Huntington 1, W. Va., Secretary.

American Clinical and Climatological Association, Colorado Springs, Oct. 13-15. Dr. James Bordley III, Johns Hopkins Hospital, Baltimore 5, Secretary.

American College of Surgeons, New York, Waldorf-Astoria Hotel, Sept. 8-12. Dr. Paul B. Magnuson, 40 E. Erie St., Chicago 11, Secretary.

American Congress of Physical Medicine, Minneapolis, Hotel Radisson, Sept. 2-6. Dr. Richard Kovacs, 2 E. 89th St., New York 28, Secretary.

American Congress on Obstetrics and Gynecology, St. Louis, Municipal Auditorium, Sept. 8-12. Mr. Karl S. Richardson, 24 West Ohio St., Chicago, Business Manager.

American Hospital Association, St. Louis, Sept. 22-25. Mr. George P. Bugbee, 18 E. Division St., Chicago, Exec. Secretary.

American Public Health Association, Atlantic City, Oct. 6-10. Dr. Reginald M. Atwater, 1790 Broadway, New York 19, Executive Secretary.

American Roentgen Ray Society, Atlantic City, Sept. 16-19. Dr. H. Dabney Kerr, University Hospitals, Iowa City, Secretary.

Central Neuropsychiatric Association, Galveston, Texas, Oct. 17-18. Dr. William C. Menninger, 3617 W. Sixth Ave., Topeka, Kans., Secretary.

Colorado State Medical Society, Denver, Shirley-Savoy Hotel, Sept. 17-20. Mr. Harvey T. Sethman, 1612 Tremont Place, Denver 2, Executive Secretary.

District of Columbia, Medical Society of the, Washington, Oct. 6-8. Mr. Theodore Wiprud, 1718 M Street N.W., Washington 6, Secretary.

International Cancer Research Congress, St. Louis, Hotel Jefferson, Sept. 2-7. Dr. Axel W. Arneson, 510 S. Kingshighway, St. Louis, Chairman Committee on Local Arrangements.

International College of Surgeons, U. S. Chapter, Chicago, Palmer House, Sept. 29-Oct. 2. Dr. Louis J. Gariepy, 16401 Grand River Ave., Detroit 27, Secretary.

Kentucky State Medical Association, Louisville, Sept. 29-Oct. 2. Dr. P. E. Blackerby, 620 S. Third St., Louisville 2, Secretary.

Michigan State Medical Society, Grand Rapids, Pantlind Hotel, Sept. 23-26. Dr. L. Fernald Foster, 2020 Olds Tower, Lansing 8, Secretary.

Mississippi Valley Medical Society, Burlington, Iowa, Oct. 1-3. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.

Nevada State Medical Association, Reno, Sept. 4-6. Dr. Moreton J. Thorpe, 17 N. Virginia St., Reno, Secretary.

Oregon State Medical Society, Portland, Sept. 4-6. Dr. Thomas S. Saunders, 1020 S. W. Taylor St., Portland 5, Secretary.

Pennsylvania, Medical Society of the State of, Pittsburgh, Hotel William Penn, Sept. 15-18. Dr. Walter F. Donaldson, 500 Penn Avenue, Pittsburgh 22, Secretary.

Southeastern Dermatological Association, Knoxville, Tenn., Hotel Andrew Johnson, Aug. 31. Dr. A. H. Lancaster, 608 W. Main Ave., Knoxville, Secretary.

Southern Psychiatric Association, Birmingham, Ala., Oct. 13-14. Dr. Newdigate M. Owensby, 384 Peachtree St. N.E., Atlanta, Ga., Secretary.

Utah State Medical Association, Salt Lake City, Sept. 11-13. Dr. Ray T. Woolsey, 316 Atlas Bldg., Salt Lake City 1, Secretary.

Vermont State Medical Society, Burlington, Hotel Vermont, Oct. 1-3. Dr. Theodore H. Harwood, 128 Merchants Row, Rutland, Secretary.

Virginia, Medical Society of, Roanoke, Oct. 13-15. Miss Agnes V. Edwards, 1200 E. Clay St., Richmond 19, Secretary.

Washington State Medical Association, Seattle, Olympic Hotel, Sept. 28-Oct. 1. Dr. Harold E. Nichols, 327 Cobb Building, Seattle, Secretary.

Western New York and Ontario Urological Society, Saranac, N. Y., Saranac Inn, Sept. 3-6. Dr. Albert M. Cranee, 525 S. Main St., Geneva, N. Y., Secretary.

Wisconsin, State Medical Society of, Milwaukee, Oct. 6-8. Mr. Charles H. Crownhart, 110 E. Main St., Madison 3, Secretary.

World Medical Association, Paris, France, Sept. 17-20. Dr. Charles Hill, B. M. A. House, Tavistock Sq., London, W. C. 1, England, and Dr. P. Cibrie, 60 boulevard de Latour-Maubourg, Paris 7e, France, Joint Secretaries.

Bureau of Information

LOCATION OF PHYSICIANS

Virginia Shuler
Chicago

This is the eighth of a series of charts showing the trend in locations of physicians from April 1946 to January 1947.

"Virginia has a very active Council on Health and Medical Care, which is supporting a program to be presented to the next session of the legislature, which will convene on Jan. 1, 1948. Some of the salient features of this program are the provision of state funds to match federal funds for the construction of medical facilities under the Hill-Burton Act—these funds to be applied where local areas cannot raise the matching amount; an increase in the amount of money ($800,000 on a matching basis) which was appropriated by the last legislature for the care of the indigent; demonstration and school health and education programs, which are already under way in five counties selected to represent average conditions in various sections of the state; study of prepayment plans as they apply to rural people; more beds for the care of open cases of tuberculosis, particularly of the infirmary type; provision and care for the mentally disabled. Recently the governor released a considerable sum of money for capital outlay and more adequate personnel for mental institutions. The question of making medical facilities available for doctors in rural sections is receiving intense study by several committees in the state. Of the utmost importance is the question of personnel. Efforts are being made to increase the salaries of the various personnel concerned in providing better health for the citizens of the state of Virginia. In order to do this it is realized that the state must increase its taxes so that they may take care of recurring obligations both in health and in education. This is a subject for discussion and debate at the present time, ultimately to be presented to the legislature. The council will formulate an overall program for health and medical care to extend over a period of years.

"The Committee on Rural Medical Service held a round table discussion at an institute on Rural Health at Virginia Polytechnic Institute in Blacksburg, Va., July 30. Approximately six hundred representatives of various farm organizations were present at this rural institute.

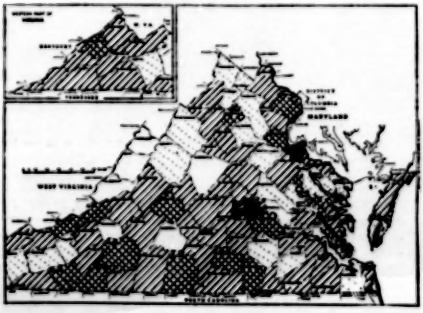
"It should be noted that the statistics regarding the distribution of doctors in Virginia may not be too accurate, but they definitely indicate a trend. Mr. Henry Johnson, director of public relations of the Medical Society of Virginia, is now conducting a survey with reference to the distribution at this time, and these figures will be available within the next few months."

H. B. Mulholland, M.D., Chairman,
Virginia Council on Health and Medical Care,
University of Virginia Hospital, Charlottesville, Va.

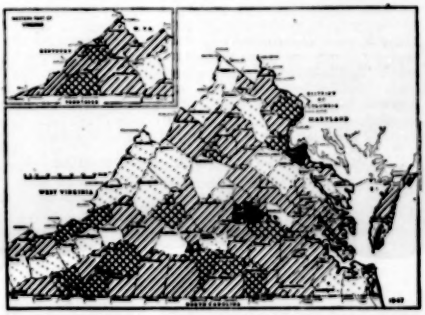
Areas in Virginia Requesting General Practitioners

County	Town	Population
Accomack		33,000
Albemarle		44,052
	Esmont	500
Amelia		8,495
Appomattox		9,020
Bedford	Big Island	551
Botetourt		16,447
	Eagle Rock	600
	Troutsville	400
Carroll		25,904
Chesterfield		31,183
Culpepper		13,365
Essex		7,006
Floyd		11,567
Greene	Stanardsville	212
Halifax		41,271
Henrico		215,002
King William		7,855
	Mangohick	50
Louisa		13,065
Lunenburg		13,844
Madison		281
	Woodberry Forest	300
Mecklenburg		31,933
	Clarksville	826
Montgomery	Elliston	550
Nelson		16,241
Orange		12,649
Patrick		16,613
Powhatan		5,671
Roanoke		112,184
Shenandoah	New Market	629
Southhampton	Capron	291
	Newsome	250
Surry	Dendron	465

VIRGINIA—1946



VIRGINIA—1947



Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

TENNESSEE

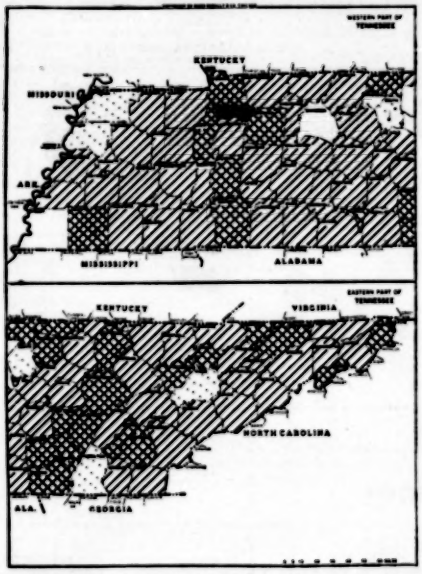
"Recent studies of distribution of physicians in Tennessee show that in metropolitan counties we have one physician for a little over one thousand population, while in other areas there are over nine thousand patients per physician. This disproportion is increased by the fact that the young doctors are in the metropolitan area, while many doctors are over 65 in the rural districts. These figures may justify the opinion of some that there is no shortage in the metropolitan districts and that steps should be taken to increase the number of doctors in the portions of the state where there is not only a lack of doctors but a deficiency in hospitals, educational, religious and cultural institutions."

W. M. HARDY, M.D., Secretary-Editor,
Tennessee State Medical Association,
510 Doctors Building, Nashville 3.

Areas in Tennessee Requesting General Practitioners

County	Town	Population	County	Town	Population
Bradley	Charleston	587	Lincoln	Petersburg	581
Hardeman	Whiteville	706	Monroe	Tellico Plains	800
Hickman	Centerville	1,000	Scott		15,966
Humphreys		12,421			
	Waverly	1,318			

TENNESSEE—1946



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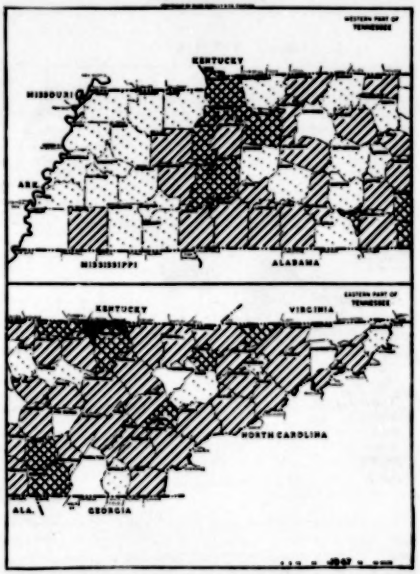


Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

NORTH CAROLINA

"We are well aware of the fact that North Carolina is now the eleventh most prosperous state in the union but is forty-second in the number of hospital beds per 1,000 population and forty-fifth in the number of doctors per 1,000 population.

"North Carolina has inaugurated a Hospital and Medical Care Program for the entire state with this noble objective as the goal—'The ultimate purpose of this program shall be that no person in North Carolina shall lack adequate hospital care or medical treatment by reason of poverty or low income.'

"The cities and small towns are adequately cared for; however, the rural areas in some sections of North Carolina are urgently in need of more physicians. At present rural North Carolina has only one doctor for each 3,613 people, and there is only one colored doctor for 6,916 colored people.

"With the state supported four-year medical school at the University of North Carolina with a 400-bed teaching hospital and a loan fund for medical students, and with medical training for negro youth, as well as grants made for the construction of new hospitals in areas not adequately served by existing hospital facilities, and the medical profession urgently insisting on voluntary insurance, we are confident that the statewide program in health and medical care will bring the state up to an average of four beds for every 1,000 population and one doctor for each 1,000 population. To this end, as quoted above, no person in North Carolina shall lack adequate hospital care or medical treatment by reason of poverty or low income."

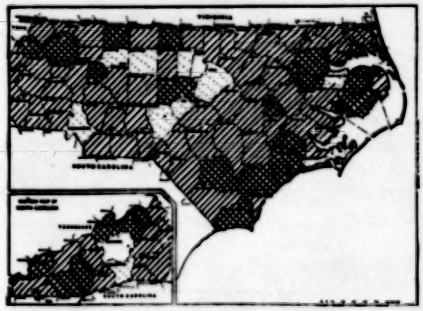
ROSCOE D. MCMILLAN, M.D., Secretary,
Medical Society of the State of North Carolina,
P. O. Box 232, Red Springs, N. C.

Areas in North Carolina Requesting General Practitioners

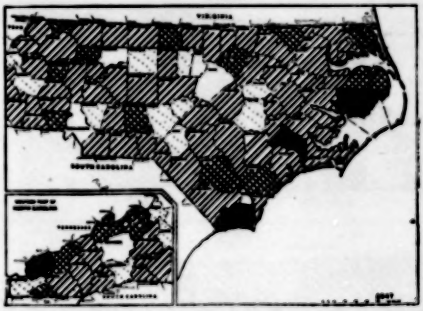
County	Town	Population
Alleghany		8,341
Ashe		22,664
	Sturgills	50
Avery		13,561
Beaufort		36,431
Cabarrus	Midland	500
Caswell	Milton	329
Cherokee		18,813
Clay		6,495
	Hayesville	336
Columbus	Acme	198
Cumberland		59,929
	Stedman	356
Dare	Buxton	600
	Hatteras Island	2,500
Davidson	Denton	677
Edgecombe	Pinetops	713
Franklin	Louisburg	2,300
Gaston	Dallas	1,704
Graham		6,418
	Robbinsville	300
Johnston		61,798

County	Town	Population
Lincoln		24,107
Macon		15,000
Madison		22,502
	Hot Springs	773
Mecklenburg		151,826
Montgomery	Star	611
New Hanover		67,955
Onslow	Richlands	600
Pamlico		9,706
Person		25,000
Randolph	Farmer	110
Robeson		70,940
	Lumberton (Negro physician)	5,000
Rockingham	Madison	1,002
Rutherford		65,377
	Bostic	200
Stokes	Danbury	250
Swain		12,177
Union	Waxhaw	611
Wake		160,544
Warren		23,145
Watauga		18,134
Wayne	Seven Springs	170

NORTH CAROLINA—1946



NORTH CAROLINA—1947



Population, based on 1943 estimated Census figures, per active physician (excludes teaching, research, hospital administration, public health and state hospitals) by county.

Key: Physician-population ratio by county: plain area 1-999, dotted area 1,000-1,499, striped area 1,500-2,999, checked area 3,000 and over, solid black area no doctor.

WEST VIRGINIA

"The distribution of doctors in West Virginia on a population basis remains about the same, except for the more populous areas. The migration is still definitely toward the urban centers. With the return of nearly all of our doctors from military service, the situation in our industrial areas is somewhat relieved, although there is still a doctor shortage in the southern coal fields. There is still an acute shortage of medical care in our rural areas, although a few returning veterans have slightly improved the overall situation.

"It is thought that there will be a great improvement in medical care facilities when our hospital construction program gets under way. A survey is now being made for this purpose.

"A new division of mental hygiene has been activated in our state health department, from which much is expected in the future. Increased appropriations this year should improve conditions in our mental and tuberculosis institutions. We have two new active committees in the state medical association—the Committee on the Study of Diabetes and the Committee on Mental Hygiene."

Mr. Charles Lively, Executive Secretary,
West Virginia State Medical Association,
302 Atlas Building, Charleston, W. Va.

Areas in West Virginia Requesting General Practitioners

County	Town	Population
Boone		20,556
	Madison	1,986
Fayette	Oak Hill	4,713
Gilmer		12,046
Hampshire		12,974
Hardy	Wardensville	195
Lewis		22,271
Logan		67,768
	Amherstdale	2,910
	Hobbin	4,730
	Mallory	717
	Omar	1,239
McDowell	Gary	1,225
	Kimball	1,580
Monongalia	Morgantown	16,655
Monroe		13,577
Morgan	Paw Paw	900
Pocahontas		13,146
	Cass	597
Preston	Brandonville	113
Raleigh	Killarney	814
	Lillybrook	808
Randolph		30,259
Webster		18,080
	Webster Springs	1,753
Wetzel		23,342
Wirt	Elizabeth	685

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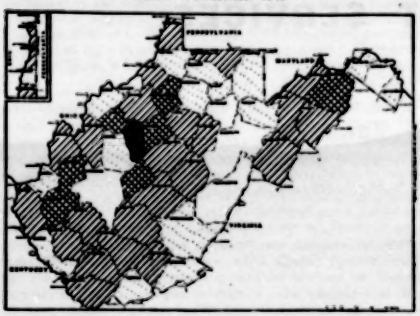
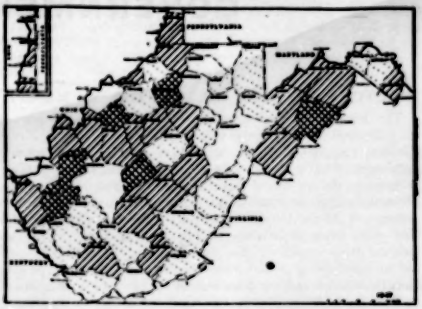
WEST VIRGINIA—1946



WEST VIRGINIA—1947



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MARYLAND and DELAWARE

Areas in Maryland Requesting General Practitioners

County	Town	Population
Baltimore City		859,100
Calvert		10,484
Caroline		17,549
Carroll		39,654
Charles		17,612
Frederick		87,512
	Brunswick	3,826
Garrett	Oakland	1,587
Howard		17,173
Kent		
	Chesterton	2,760
	Galena	250
	Millington	307
Saint Marys		14,628
Washington		49,858

W. H. TOULSON, M.D., Secretary,
Medical and Chirurgical Faculty of Maryland,
1211 Cathedral Street, Baltimore 1.

Area in Delaware Requesting General Practitioner

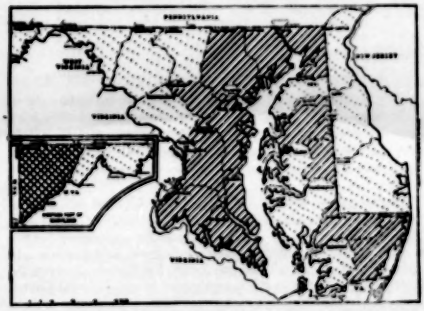
County	Town	Population
Sussex	Milton	3,000

C. L. MUNSON, M.D., Secretary,
Medical Society of Delaware,
1005 Jefferson Street, Wilmington, Del.

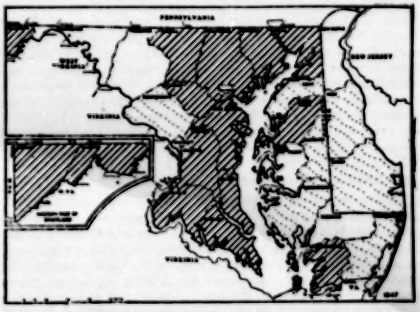
No areas in the District of Columbia requesting general practitioners.

MR. THEODORE WIPRUD, Secretary,
Medical Society of the District of Columbia,
1718 M Street N.W., Washington 6, D. C.

MARYLAND AND DELAWARE—1946



MARYLAND AND DELAWARE—1947



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GOVERNMENT SERVICES

ARMY

DOCTORS TO GET EXTRA $100 A MONTH

The Surgeon General announces that effective September 1 an additional $100 a month will be paid to all Regular Army Medical and Dental Corps officers as well as other officers serving voluntarily on extended active duty in these corps. This addition to the income of these officers is regarded by the War Department "as an equalization measure designed to bring the incomes of Medical and Dental Corps officers more nearly in line with those of civilian doctors and dentists." Surgeon General Bliss explained that the additional compensation will aid in reimbursing these officers for the costs of their professional education and for their loss of earnings while in medical or dental school.

The Army will also follow a new policy of commissioning selected doctors and dentists in the Regular Army in grades as high as colonel, depending on their age and professional qualifications. The measure authorizing such appointment also provides for such officers to be credited, for purposes of promotion, with the minimum number of years of service "now or hereafter required for promotion of officers of the Medical and Dental Corps to the grade in which appointed."

These important changes in the Army's medical program were made possible by legislation signed by President Truman August 5. This measure is in the form of an amendment to the Pay Readjustment Act of 1942.

General Bliss said the $100 increase in compensation will benefit not only Regular Army medical and dental officers but also Reserve, National Guard and Army of the United States Officers. Former students of the Army Specialized Training Program who are required to serve on extended active duty are eligible for this increase in compensation when they apply for and are accepted into the Regular Army. The enabling legislation limits the duration of these benefits to thirty years of active service. The extra $100 monthly compensation will be paid not only to officers who are on extended active duty as of September 1, the effective date of the legislation, but to all eligible Medical and Dental Corps officers who are commissioned in the Regular Army or who volunteer for extended active duty within the next five years.

MEDICAL SERVICE CORPS CREATED

A change in the permanent organization of the Medical Department of the Army went into effect August 5 following the President's approval of legislation creating a Medical Service Corps in the regular establishment. This legislation makes it possible for the first time to give Regular Army commissions to specialists in fields closely allied to medicine—to bacteriologists, entomologists, psychologists, sanitary engineers, pharmacists, chemists, electronics experts and the like. These will be grouped together in a new corps under the Medical Department of the Army. Previously the Medical Department was made up of six corps—Medical, Dental, Veterinary, Pharmacy, Nurse and Women's Medical Specialists. It has been possible to commission specialists in other fields only in the reserve, from which they could be called to service in a national emergency.

It became evident during the two world wars, with the new ramifications of medical science, that greater reliance must be placed on these other specialists. They could relieve the Army Medical Corps, in which only physicians can hold commissions, of a great deal of clinical laboratory and sanitary engineering activities, psychiatric social work and clinical psychology, pharmacy, supply and hospital administration, certain phases of training and field medical service, and in certain fields of research requiring specialized skills and training.

During World War I, half the commissioned personnel of the Medical Department were physicians. In the last war this percentage had fallen to about one third, with the difference taken up largely by specialists in fields allied to medicine. This is bound to constitute more and more the situation in the future as the ramifications of medicine extend into other sciences and new problems arise. It is impossible to predict what kind of a specialist will be needed tomorrow.

Under the present legislation the Surgeon General may use his discretion, as the need arises. An expert in enzyme chemistry, for example, can be given a regular commission in the new Medical Service Corps with no more complications than would be involved in commissioning a brain surgeon in the Medical Corps. The strength of the new corps will be prescribed by the Secretary of War. Grades will range from second lieutenant to colonel.

THE ARMY'S HYDROPONIC GARDENS

The Army is producing fresh vegetables for use with the ration in overseas installations in large quantities by the hydroponic method of gardening. Hydroponic gardens are being operated in places where transportation does not permit shipping fresh vegetables and where there is an inadequate rainfall, a lack of suitable soil or other difficulties which preclude growing vegetables in the ground. Hydroponic gardens are being operated on Iwo Jima, Atkinson Field in British Guiana, at Nanking, China, and in Japan. The garden at Chofu near Tokyo comprises 55 acres and the one at Otsu 25 acres. These are probably the largest and most productive gardens of their kind in the world. The hydroponic gardening method consists in using beds of gravel, stones or cinders or other inert materials for growing vegetables, supplying them with water and the necessary nutrient chemicals for their growth. The cost of producing vegetables by this method is low in comparison with the cost of transporting vegetables by refrigerator transportation over very long distances. The gardens now in use are expected to produce during the present growing season 2,000,000 pounds of tomatoes, 440,000 pounds of cucumbers, 310,000 pounds of lettuce, 200,000 pounds of radishes, 170,000 pounds of onions and 60,000 pounds of pepper, or sufficient to provide eight salad meals a week for 100,000 military personnel and their dependents.

Here is a representative list of chemicals of fertilizer grade comprising the nutrient solution in hydroponic gardening:

Potassium nitrate	19.8%
Potassium sulfate	17.9%
Calcium sulfate	27.3%
Magnesium sulfate	18.7%
Monocalcium phosphate	11.2%
Ammonium sulfate	5.1%
	100.0%

Also required in minute quantities are ferrous sulfate, ferric ammonium citrate, manganese sulfate, manganese chloride, boric acid, borax sodium tetraborate, copper sulfate and zinc sulfate.

A ten bed garden unit, occupying about half an acre of land, is capable of producing enough to serve four hundred men a salad a day.

The origin of hydroponics dates back to 1699, when crude experiments were conducted. In 1925 a number of universities took up research on its possible commercial application, but the lack of specially trained operators hampered its expansion. In 1944 Gen. H. H. Arnold of the Army Air Forces observed the hydroponic activities at the Convalescent Hospital, Coral Gables, Fla., in connection with the rehabilitation program, and he secured skilled and competent authorities to develop a program for supplying the air forces with fresh fruits and vegetables from hydroponic gardens. The Air Forces withdrew from this activity in 1946 and the Quartermaster Corps was authorized

to take it up and establish new gardens where certain conditions existed. A school of instruction in this work was opened in Japan in 1946 and was attended by 3 Ph.D.'s and 61 men with degrees in agriculture. This method may develop on a large scale in Japan, where less than 17 per cent of the land is sufficiently fertile to grow vegetables. The arable soil too is contaminated because of the long custom of using night soil as fertilizer. Soil-grown vegetables are not served to U. S. troops there without being cooked, on account of the danger of contracting amebic dysentery.

VETERANS ADMINISTRATION

TUBERCULOSIS HOSPITAL AT OTEEN

The 1,000 bed hospital at Oteen, N. C., built as an army general hospital during World War I was subsequently transferred to the U. S. Public Health Service and later to the Veterans Administration, which is using this facility as a tuberculosis hospital. The original army buildings have been replaced by permanent structures. It is 6 miles from Asheville in the Smoky Mountains National Park and on the eastern approach is the reservation of the Eastern band of Cherokee Indians, 3,000 of whom still follow their tribal customs and crafts.

Five resident physicians are training in thoracic surgery at the Veterans Administration Hospital, Oteen, N. C., where such a training program has been in effect since February. Nearly

Tuberculosis Hospital at Oteen, N. C.

twenty other young doctors are training in other fields, while a class of cadet nurses has just completed a six months course in general nursing.

The resident physicians in training are young doctors who have completed the Army Student Training Program and the Navy V-12 courses and are now on loan from the Army and Navy to the Veterans Administration. Besides thoracic surgery, training is being given also in the diagnosis, care, treatment and rehabilitation of tuberculous veterans.

The Veterans Administration is in need of nurses for tuberculosis hospitals, and a training center has been established at the Oteen hospital for graduate and senior cadet nurses who desire to specialize in this kind of work. The salaries range from $2,644 to $6,000. Applications should be submitted to the Veterans Administration branch office having jurisdiction over the territory where nurses desire to work.

ADDITIONS TO THE STAFF

The chief medical director has announced the addition to the staff of the Veterans Administration department of medicine and surgery in Washington, D. C., of Dr. George M. Lyon, Huntington, W. Va., Dr. Louis G. Welt, Willimantic, Conn., and Dr. Earl A. Martin, a native of Ohio.

Dr. Lyon, who will develop laboratories for the use of radioactive isotopes in treatment of veteran patients, from 1936 to 1942 was a member of the joint committee on health problems on education of the American Medical Association and the National Education Association. He served during World War II as chemical warfare officer for the naval forces in Europe and later was safety adviser for the staff of the commander of the joint Army-Navy Task Force No. I. Dr. Welt will engage in research projects for the Research and Education Service of the Veterans Administration department of medicine and surgery. He is certified by the American Board of Internal Medicine and during World War II served with the 39th General Hospital in malaria control work and later in the office of the chief surgeon, general headquarters, AFPAC, and was editor of the *Journal of Military Medicine in the Pacific*. Dr. Martin has been appointed associate member of the Board of Veterans Appeals. He was commissioned in the Army Medical Corps in 1944 and assigned to the Veterans Administration, where he has been on duty since 1941. Formerly he was chief of the diagnostic center at the Veterans Administration Facility at Hines, near Chicago.

Dr. Gert Heilbrunn, former assistant clinical professor of psychiatry, University of Illinois College of Medicine, Chicago, has been appointed chief of the neuropsychiatric section of the Northwest Branch of the Veterans Administration, with headquarters in Seattle, where he also plans, it is reported, to enter private practice. Dr. Heilbrunn is a graduate of the University of Berne, Switzerland.

MISCELLANEOUS

SALE OF SURPLUS GOVERNMENT PROPERTY

The War Assets Administration Regional Office, 728 15th Street, Denver 2, is conducting a sale of pharmaceuticals, chemicals and drugs. Physicians who are veterans have certain priorities in the purchase of this government property. The sale closes August 25.

EXAMINATIONS FOR POSITION AS OCCUPATIONAL THERAPIST

The U. S. Civil Service Commission announces an examination for probational appointment to the position of occupational therapist with salaries ranging from $2,644 to $5,905 a year for service in Veterans Administration hospitals and regional and branch offices throughout the United States. One position is open in the central office of the Veterans Administration in Washington, D. C. Applicants must be graduates of schools of occupational therapy approved by the American Medical Association or, in case of graduation prior to 1938, by the American Occupational Therapy Association, and must have certain other qualifications. Applications must be filed in the various Veterans Administration branch offices throughout the country not later than August 12.

PLACEMENT OF BLIND CIVILIANS

The Office of Vocational Rehabilitation conducted a training institute in Washington late in June to stimulate commercial placement of blind civilians. In attendance were employment specialists from eighteen state vocational rehabilitation agencies who received instruction in public relations, design and layout of equipment, merchandising, advertising and other subjects related to the program of helping the blind undertake business enterprises. On completion of the short course in training, the state representatives returned to their home states to give further help in preparing eligible blind persons to engage in small business enterprises successfully.

PHYSICIANS SEPARATED FROM SERVICE

ARMY MEDICAL CORPS OFFICERS RECOMMENDED FOR/OR RELIEVED FROM ACTIVE DUTY

Alabama

Blake, Thomas M.....Sheffield
Lowe, James C.....Florence
McPherson, George Jr.....Demopolis
Moody, Maxwell Jr.....Tuscaloosa
Savage, Charles H. Jr.....Crichton

Arizona

dosRemedios, Leonardo V.....Phoenix
McWhirt, Willis E.....Tucson

California

Bormann, Edwin L.....San Diego
Bourdeau, Maynard S.....Glendale
Brown, Don C.....Los Angeles
Buffum, Robert L.....Long Beach
Davis, Gerald E.....San Jose
Diamond, Abraham J.....Los Angeles
Erler, Theodore G. Jr.....San Francisco
Fiske, David.....Berkeley
Haymaker, Webb E.....San Francisco
Hoffman, Malcolm E.....Berkeley
Prigge, Edward K.....Los Angeles
Steel, Lowell F.....Chico
Walters, Richard D.....Fullerton
West, Ernest J.....San Jose

Connecticut

DiGiandomenico, Albert T.....Middletown
Eckert, George R.....Danbury
Harrison, William Jr.....Derby
Mendillo, John J.....Hamden
Mongillo, Frank.....New Haven

Florida

Carlton, Leffie M. Jr.....Wauchula
Mitchell, George A.....Miami
Young, Robert W.....Daytona Beach

Idaho

Derring, Raymond E.....Grangeville
Tinley, John W.....Lewiston
Galloway, Augustus F.....Weiser
Kircher, James R.....Preston

Illinois

Brown, Mercer T.....Zion
Brown, Ralph G.....Winnetka
Bullock, Norman C.....Rockford
Burdon, Stephen B.....Lowpoint
Colangelo, Cornelius C.....Chicago
Dinolt, Robert.....Chicago
Doretti, Peter J.....Chicago
Harrison, Rollie M.....Chicago
Jablonowski, Alexander J.....Chicago
Kaye, Jerome J.....Oak Park
Monroe, John W.....Benton
Paul, Jerome T.....Evanston
Pfister, Peter C. W.....Chicago
Rock, Frederick.....Chicago
Rubert, Samuel R.....Chicago
Shaffer, James M.....Evanston
Slusser, Gerald A.....Villa Grove

Indiana

Hasler, Norman B.....Worthington
Kelley, Clement E. Jr.....Indianapolis
Kennedy, Julien C.....Indianapolis
Peck, James F.....Princeton
Russell, O. Raymond.....Frankton
Salassa, Robert M.....Indianapolis
Warren, John C.....Indianapolis
Warren, Ward B.....Marshall
Witham, Robert L.....Indianapolis

Iowa

Brewster, Edward S.....Boone
Cauldwell, Earl W.....Oskaloosa
Ely, George B.....Iowa City
Langford, William R.....Epworth
Moore, Gage C.....Ottumwa
Pohl, Donald E.....Council Bluffs
Schrader, Merlin A.....Webster City

Kansas

Brown, Robert O.....Kansas City
Claybourn, Norman L.....Kansas City
Greenhouse, Abraham C.....Leavenworth
Savory, John H.....Atchison
Van Deventer, Roy W.....Wellington

Kentucky

Durham, William C.....Central City
Glanton, James B.....Georgetown
Hulett, Paul M.....Louisville
McAllister, Roy S.....Shelbyville
Minish, Lawrence T. Jr.....Louisville
Pfister, Howard F. C.....Fort Thomas
Rosenbaum, Harold D.....Fairplay

Louisiana

Dileo, Samuel J.....New Orleans
Durham, Thomas M. Jr.....Alexandria
Ferris, Harold A. Jr.....New Orleans
Johnson, Philip B.....New Orleans
LaRocca, Henry A.....Algiers
Sabatier, Harold J.....Elton

Maryland

Bryson, William J.....Catonsville
Cox, Matthew M.....Sparrows Point
Day, Edward C.....Baltimore
Hollander, David H.....Baltimore
Kauffmann, William P.....Silver Spring
King, Joseph D. B.....Baltimore
McClafferty, William J.....Baltimore
Siver, Robert H.....Cockeysville

Massachusetts

Burnett, Joshua B.....Newtonville
Herter, Frederic P.....Milis
Lareau, Henry R.....Malboro
Lawlor, Edward F.....Lawrence
Lawrence, Bradford W.....W. Somerville
Leary, John E.....Springfield
Ralston, Richard M.....East Weymouth
Walker, Thomas.....Andover

Michigan

Bovill, John C.....Dearborn
Caven, Hugh J.....Detroit
Lenz, Charles R.....Jackson
Monson, Robert C.....Detroit
Zarzecki, Casimer A.....Grand Rapids
Zick, Luther H.....Albion

Minnesota

Chalgren, William S.....Minneapolis
Nay, Richard M.....Rochester
Sanderson, Oscar M.....Minneapolis
Segal, Martin A.....Minneapolis
Warren, Cecil A.....St. Paul

Mississippi

Beard, John C. Jr.....Money
Busby, William Jr.....Hattiesburg
Holleman, Jeremiah H.....Pickens
McCarthy, Carroll E.....Baldwyn
Tillman, Clifford.....Natchez

Missouri

Fellhauer, Carl M.....St. Louis
Goldman, Stanley L.....Kansas City
Hess, Paul D.....Kansas City
Martin, John N.....Unionville
Reilly, Terence M.....St. Louis
Viscofsky, Jack.....Kansas City

Montana

Craft, Charles B.....Bozeman

Nebraska

Brown, R.....Beatrice
Cashen, Russell M.....Lincoln
Christie, David P.....Omaha
Peters, Roy M.....Omaha
Warner, George W.....York

New Jersey

Berg, Samuel.....Newark
Bibighaus, Warren Y.....Collingwood
Donnelly, John H.....Newark
Holaday, Duncan A.....Highland Park

New Mexico

Ellis, Herbert B. Jr.....Raton
Pate, Rupert H.....Lake Arthur

New York

Bauer, Laszlo.....Jackson Heights
Bax, Alphonso L.....Niagara Falls
Concannon, Joseph P.....Little Neck, L. I.
Fiore, Peter P.....Brooklyn
Fishman, Alfred P.....Brooklyn
Norton, Gilbert C.....New York
Ormandy, Laszlo.....New York
Sausville, Albert J.....Brooklyn
Savage, Eric D.....Tarrytown
Scharfman, Ephraim.....Brooklyn
Van Sciver, Alan E.....Larchmont
Vetromile, Gerard A.....Merrick, L. I.
Vournas, Christopher G.....Brooklyn
Warner, Robert.....Buffalo
Way, Howard S. Jr.....New York
Whittlesey, William N.....New York

North Carolina

Cordice, John W. V.....Durham
Corpening, William N.....Granite Falls
Davis, William H. Jr.....Durham
Garber, Edgar C. Jr.....Greensboro
Hart, Lillard F.....Winston-Salem
Hoggard, William A. Jr.....Hertford
Shields, Daniel R. Jr.....Gastonia
Swain, Wingate E.....Shallotte
Toney, Ellis E. Jr.....Oxford
Wadsworth, Joseph A. C.....Durham
Wallace, Winter C.....Rutherfordton

Ohio

Alter, Albert J.....Toledo
Balz, Frederic F.....Columbus
Barrett, Raymond J.....Akron
Barson, Lloyd J.....Van Wert
Brust, Albert A. Jr.....Chillicothe
Eckert, Joseph J.....Akron
Edmonds, Kendrick T.....West Alexandria
Fauster, John U. Jr.....Defiance
Goldberg, Lawrence I.....Youngstown
Hyde, Burton E. L.....Troy
Jackson, James F.....East Liverpool
Juler, Edward T.....Cincinnati
McGlew, James A.....Youngstown
Maxwell, Thomas B.....Mansfield
Preuss, Fred S.....Cleveland
Scanlon, Charles P.....Cleveland
Scarnecchia, John L.....Youngstown
Schall, Sydney.....Toledo
Thomas, Maurice C.....Dayton
Urich, Raoul W.....Elyria
Viktoryn, John W.....Cleveland
Warner, Calvin F.....Cincinnati
Wehling, Benjamin B.....Barberton

Virginia

Devine, John W. Jr.....Lynchburg
Harrington, Roberts H.....Marion
Hooten, William S.....Lynchburg
Law, Maynard H.....Roanoke
Warren, Allan B. Jr.....Orange
White, John W.....Arlington

West Virginia

Boggs, William C.....Wheeling
Harvey, Harold N.....Institute
Hines, Brainard E.....Charleston
Wood, Robert C.....Lewisburg

Wyoming

Lewis, Ray B.....Kemmerer

Medical News

(Physicians will confer a favor by sending for this department items of news of general interest: such as relate to society activities, new hospitals, education and public health. Programs should be received at least two weeks before the date of meeting.)

CALIFORNIA

Health Officer Retires to Take Up Private Practice.—Dr. Peter J. Cuneo retired as health officer of the city of Bakersfield after nearly thirty-two years of service to devote his time to private practice, when the public activities in Bakersfield were placed under the Kern County Health Department, April 3.

Plague Infection.—First reports of plague from specimens of rodents or their ectoparasites for this year were reported by the Bureau of Vector Control in June. In Monterey County plague was found in fleas from captured rodents in two locations south of the city of Monterey, and in Lassen County plague was traced to fleas and lice from rodents captured in Nubieber and to fleas from rodents south of Adin.

Course in Psychiatry and Neurology.—The Langley Porter Clinic, the Medical Center, San Francisco, will offer a twelve weeks course in psychiatry and neurology beginning September 8. Courses will be given by the Division of Psychiatry, University of California Medical School, Berkeley-San Francisco, in cooperation with the University Extension Division. Hours will be from Monday to Friday, 9 a. m. to 5 p. m., with work on Saturdays, 8 to 10 a. m. Registration is limited to 60 persons.

Committee to Make Cancer Survey.—The Cancer Committee of the San Francisco County Medical Society is undertaking a survey of the cancer control program. The general purposes are (1) to gather and present significant and statistical epidemiologic data and suggest ways in which more information can be secured, (2) to determine educational activities being conducted and how they can be expanded, (3) to obtain information on present diagnostic and treatment services and (4) to coordinate the resources for cancer control. The survey will be under the direction of Dr. Lester Breslow of the California Department of Public Health.

CONNECTICUT

Personal.—Dr. Louis G. Welt, clinical instructor of medicine at Yale University School of Medicine, New Haven, has been appointed to a medical research post with the Veterans Administration, Washington, D. C. Dr. Walt received his medical degree at Yale University School of Medicine, 1938, and has practiced medicine in Connecticut since 1939.

Annual Clinical Congress.—Dr. Francis G. Blake, dean of the Yale University School of Medicine, New Haven, and chairman of the Committee on the Clinical Congress of the Connecticut State Medical Society, has announced that the 1947 congress will be held in New Haven on September 16-18. Members of the committee, all of New Haven, include Drs. Gerbert E. Thoms, Arthur J. Geiger, Courtney C. Bishop, Harry B. Shumacker Jr., Hugh M. Wilson, Frederick C. Redlich, William R. Wilson and Daniel C. Darrow.

ILLINOIS

Narcotic Violation.—The Treasury Department, Bureau of Narcotics, advises that Dr. Arthur W. LoVene, Oquawka, pleaded guilty at Springfield to violation of the Federal Narcotic Act, and on July 25 was sentenced to a term of thirty days.

Improved Water Supplies.—The state sanitary water board has approved plans for the installation of new or improved water systems in nine Illinois communities, at Cambria, Nauvoo, Normal, East St. Louis, Neponset, Creal Springs, Wayne City, Tolono and Riverside.

Open Cancer Diagnostic Clinic.—A new state aided cancer diagnostic clinic was opened this month at Graham Hospital, Canton, under the direction of Drs. David A. Bennett, Roy L. Patterson, Marcos A. Quinones and Roderick H. Maguire, all of Clinton. Clinic sessions, beginning at 10 a. m., are scheduled for the first Thursday following the first Monday of each month.

New Building for Keeley Institute.—A new $500,000 hospital building for the treatment of alcoholic addicts will be built on a 20 acre site at Dwight, Ill., for the 68 year old Keeley Institute. The building will accommodate 75 more patients, which will include women, up to this time excluded. It will have 84 rooms, dining facilities for 130, treatment rooms and administrative offices.

Competitive Examination for Health Officers.—The Illinois Department of Public Health announces a competitive examination for health officers which will be held in Chicago on October 27. This examination is being held for the purpose of obtaining a list of eligible persons from which the Board of Health of the Champaign-Urbana Health District, Champaign, and the Stickney Health District, Cook County, may select health officers. These positions will carry salaries of about $7,000 a year. Admission to the examination will be limited to persons having training and/or experience in the public health field. For information write to Roland R. Cross, M.D., Director, Illinois Department of Public Health, Springfield.

Chicago

Open the Exhibit on Growth.—"The Miracle of Growth," an exhibit of growth and development of the individual from conception through adolescence, was unveiled at the Museum of Science and Industry in Jackson Park, August 6. The exhibit, produced by the department of medical and dental illustration of the Chicago Professional Colleges of the University of Illinois, was presented to the museum by Dr. George D. Stoddard, president of the university. The display represents an extensive experiment in visual education. Physical, mental and psychologic growth of the normal individual are portrayed. A transparent pregnant woman is the central figure of the display. The story of growth is revealed in the thirteen wall cases showing the growth of the child through adolescence. The principles of heredity are discussed in a series of electrically controlled questionnaires. The official opening of the exhibit climaxes more than two and a half years of planning, development and construction by Professor Thomas S. Jones and his staff.

Dr. Kendell to Head Department of Physical Medicine.—Dr. Herbert W. Kendell, Chicago, former medical director of the Chicago Intensive Treatment Center, has been named head of the department of physical medicine at the University of Illinois. The department, established last year, represents a combination of the departments of physical therapy and occupational therapy. Dr. Kendell has just completed a Baruch fellowship for graduate study in physical medicine at the Mayo Clinic, Rochester, Minn., and at the Massachusetts Institute of Technology, Boston. After graduating at the University of Cincinnati Medical School in 1933 he joined the staff of Miami Valley Hospital, Dayton, where six years later he became head of the department of physical medicine. Later he became medical director of the Chicago Intensive Treatment Center, U. S. Public Health Service. In 1944-1945 he was an associate professor in the department of physical medicine at Northwestern University and also served as medical director of the State Fever Therapy unit and Brookhaven Medical Center at Brookhaven, Miss. He is president-elect of the American Congress of Physical Medicine.

MARYLAND

Dr. Sadusk Appointed Associate Medical Director.—Dr. Joseph F. Sadusk Jr., Baltimore, has been appointed to the home office staff of the Prudential Insurance Company of America as associate medical director. A graduate of Johns Hopkins University School of Medicine, Baltimore, 1935, he was an instructor in medicine at Yale University from 1939 to 1942 and returned to Yale in 1946 as assistant professor of medicine. He served in the U. S. medical corps, 1942-1946, and was discharged with the rank of colonel. During his war service he was the executive officer of the United States of America Typhus Commission, which awarded him the Typhus Commission Medal.

MASSACHUSETTS

Dr. C. Guy Lane Becomes Professor Emeritus.—Dr. C. Guy Lane, Boston, chief of the dermatologic service, Massachusetts General Hospital, Boston, since 1936 retired June 1 and will devote his entire time to private practice. A graduate of Harvard Medical School, Boston, 1908, Dr. Lane joined the dermatology department in September 1919, following postgraduate training in New York and service in World War I. In 1928 he was appointed dermatologist to the hospital. In 1943 he continued his work beyond the hospital retirement age because of war emergency. He was instrumental in the formation of the American Board of Dermatology and Syphilology and served many years as its secretary. Dr. Lane has been appointed emeritus professor of dermatology at Harvard Medical School, where he has been teaching since 1925.

MICHIGAN

Community Honors Veteran Doctor.—About 400 physicians in central Michigan, patients and friends of Dr. Bert C. Hall, Pompeii, attended a dinner in celebration of his half century as a county physician July 6. A scroll from the Gratiot-Isabella-Clare counties medical association was presented to Dr. Hall, along with other gifts.

Impostor Put on Probation.—Recorder's Judge George Murphy, Detroit, July 14, placed Theodore H. Cole, 23, of 89 Canfield Avenue East, Detroit, on a year's probation for practicing medicine without a license. Cole, a student at Cass Technical High School, admitted prescribing for a score of patients and participating in an appendectomy. During the war he said he had served in the Army Medical Corps.

New Director of Kimball Sanatorium.—Dr. Arthur S. Kimball, Pontiac, on August 1 took over the directorship of the Arthur S. Kimball Sanatorium, Battle Creek, Calhoun County tuberculosis hospital named in honor of his father. He succeeds Dr. W. Leonard Howard, Battle Creek, who resigned to become head of Maybury Sanatorium at Northville. A graduate of McGill University Faculty of Medicine, Montreal, in 1939, he has been medical director of the Oakland County Tuberculosis Sanatorium at Pontiac.

Rural Health Conference.—The Michigan Rural Health Conference will be held at Snyder Hall and the Fairchild Theater, Michigan State College, East Lansing, September 18-19, sponsored by the Michigan State and Ingham County medical societies and twenty-five other state health, rural and educational organizations. Section meetings will be held for discussions of (1) Hospital Facilities and Health Centers, (2) Bringing and Holding Physicians in Rural Areas, (3) Financing Personal Health and (4) Nursing and Ancillary Needs of Rural Communities.

Personals.—Dr. M. William Clift, Flint, chief of radiology at Hurley Hospital since 1932, became radiologist at Midland Hospital July 1. He has served as radiologist in Receiving, Wyndotte and Shirley hospitals, Detroit, and was an associate professor at Detroit Medical College.——Dr. Frederick H. Shillito, formerly of Kalamazoo, Mich., and now medical director for Pan American Airways' transatlantic division, made the inaugural flight of Pan American's commercial round the world service last month.

MINNESOTA

Dr. Helmholz Honored.—At the recent International Congress of Pediatrics in New York, several Latin American countries honored Dr. Henry F. Helmholz, professor of pediatrics, Mayo Foundation, University of Minnesota. Dr. Helmholz was awarded certificates of honorary membership in the Latin American Division of the American Academy of Pediatrics and in the Sociedade Brasileira de Pediatrics. He also was decorated in the National Order of Merit of Carlos J. Finlay in the grade of Commander from the Cuban government in recognition of his services in furthering pediatric practice in Latin American countries.

NEVADA

State Medical Meeting at Reno.—The Nevada State Medical Association will hold its annual meeting September 5-6 at the State Building, Reno, under the presidency of Dr. John A. Fuller, Reno. Out of state speakers will be:

Dr. Jack M. Farris, Los Angeles, Vagus Resection and Peptic Ulcer.
Dr. Edwin A. Lawrence, Salt Lake City, Surgery of the Diseases of the Chest.
Dr. Verne T. Inman, San Francisco, Anatomicophysiologic Problems Associated with Poliomyelitis.
Dr. Herbert H. Darling, San Francisco, Discussion of Veterans' Problems.
Dr. Earl R. Miller, San Francisco, Isotopes and the Effect of Radioactive Iodine on Thyroid.
Dr. Samuel H. Hurwitz, San Francisco, Allergy in General Practice.
Dr. David O. Harrington, San Francisco, Radiation Therapy in Ophthalmology.

NEW JERSEY

Dr. O'Crowley Receives Award.—At the June meeting of the Academy of Medicine in northern New Jersey, Dr. Clarence R. O'Crowley, Newark, N. J., received the Edward J. Ill award. On the plaque presented to him he was designated as "scholarly urologist, resourceful executive, forceful citizen." Dr. O'Crowley is a graduate of the Columbia University College of Physicians and Surgeons, New York, 1904. He is on the staff of various hospitals as a consultant urologist and is a past president of the American Urological Association, the New York Urological Society and the American Association of Genito-Urinary Surgeons and professor of urology in the Graduate School of the University of Pennsylvania. He is now on the editorial board of the *American Journal of Surgery*.

NEW YORK

New Wings and Other Buildings.—Nassau County's Meadowbrook Hospital, Hempstead, will construct two new wings and other new buildings and expand existing facilities in a building program to cost $6,200,000. The program will give the institution 615 beds, more than double its present capacity, and will furnish quarters for 300 nurses, a 65 car garage, enlarged kitchen and operating facilities, and a medical examiner's laboratory and office.

Personal.—Dr. Nelson W. Strohm, Buffalo, has been appointed full time director of Tuberculosis Control in the Buffalo Department of Health. He has been associated with the chest clinic of the Division of Communicable Diseases of the Buffalo Health Department since 1919, and since February 1 of this year has been chief of the diagnostic clinic of the health department. He is a graduate of the University of Buffalo School of Medicine and an associate in medicine on the faculty.

Illegal Practitioners Convicted.—The Medical Society of the County of Erie reported in its July Bulletin that a New York County jury on June 26 convicted two persons who represented themselves as chiropractors, under the sections of the state education law which prohibit the practice of medicine by any one who does not possess a registered license in medicine. The defendants, Michael and Kathryn Scallon, had treated or attempted to treat a 16 year old girl, who later died of tuberculosis, by means of chiropractic adjustments.

New York City

Course in Manipulative Surgery.—Columbia University College of Physicians and Surgeons will offer from 9 a. m. to 5 p. m., September 8-11, a concentrated course in manipulative surgery at the Columbia Presbyterian Medical Center by Dr. James B. Mennell, St. Thomas Hospital of London and Oxford University.

City Tuberculosis and Health Association.—Dr. Herbert R. Edwards, director of the Bureau of Tuberculosis, New York City Department of Health, has been appointed executive director of the New York City Tuberculosis and Health Association. He will succeed Frank Kiernan September 1. Dr. Edwards is a past secretary of the National Tuberculosis Association. He has served in the departments of health of Virginia, Connecticut and New York City, with which he has been associated since 1934.

The Salmon Lecture.—Harold D. Lasswell, Ph.D., Washington, D. C., has been elected to deliver the Salmon lectures for 1947, sponsored by the Salmon Committee on Psychiatry and Mental Hygiene of the New York Academy of Medicine. His lectures on "The Dynamics of Power and Personality" will be delivered on Wednesday, Thursday and Friday evenings, November 12-14, at the Academy of Medicine. Dr. Lasswell, professor of law, Yale University, is a consultant of the department of state, and since 1939 he has been director of the war communications research. Each year the Salmon Committee selects a lecturer who it deems has made the greatest contribution to his particular field during the preceding year. The chairman of the committee is Dr. C. Charles Burlingame, psychiatrist, Hartford, Conn.

Teaching Affiliation with St. Luke's Hospital.—Columbia University and St. Luke's Hospital announced July 19 an affiliation effective immediately for the teaching of medical students and the training of hospital residents and graduate physicians. Twenty-four students of Columbia University College of Physicians and Surgeons will serve their clinical clerkships in the wards and laboratories of St. Luke's under the instruction of members of the hospital staff directed by Dr. John F. Keating, chief of staff of the hospital's medical board. The St. Luke's medical board will continue to appoint interns and residents, the latter to be considered graduate medical students for whom the hospital and university will provide advanced instruction and experience. St. Luke's will train the doctors in its wards, operating rooms and other hospital facilities, while Columbia will offer them opportunities in its scientific laboratories for specialized instruction, research and advanced training under its established program of graduate medical education. Members of the hospital staff who are directly responsible for instruction will be appointed to academic posi-

tions in the university. A joint committee of the medical board of the hospital and the Columbia faculty of medicine will be created to coordinate the cooperative educational program and to make recommendations to both institutions on any matters affecting the program. The agreement states that "nothing in this teaching affiliation shall be construed to interfere with the separate corporate organization or the administration of the professional services of St. Luke's Hospital." This affiliation now formalizes what has been always an agreeable and productive liaison.

NORTH CAROLINA

State Medical Election.—At the recent annual meeting of the Medical Society of North Carolina at Virginia Beach, Va., Dr. Frank A. Sharp, Gainsboro, became president, Dr. James F. Robertson, Wilmington, president-elect and R. Roscoe D. McMillan, Red Springs, secretary-treasurer.

University Appointments.—The department of medicine, Duke University School of Medicine, Durham, has recently added the following members to its staff: Dr. John Hickam, research fellow of American College of Physicians, Emory University School of Medicine, Atlanta, Ga.; Dr. Frank L. Engel, associate in medicine, Emory, 1945 to 1947, and Dr. Jack D. Myers, associate in medicine, Emory, 1946 to 1947.

OHIO

Professor Woodward Retires.—Dr. Henry L. Woodward, Cincinnati, has retired as professor of obstetrics and director of the department of obstetrics at the hospital of the University of Cincinnati College of Medicine. Dr. Woodward, who has held the rank of professor and hospital department director since 1925, developed the residency system of training in obstetrics at the hospital. He served for forty-five years without financial compensation from the University of Cincinnati. The university board authorized a resolution in tribute to Dr. Woodward for his long service.

To Grant Degree in Industrial Medicine.—Plans for a new instructional unit, an Institute of Industrial Health, at the University of Cincinnati, have been announced under which study will lead to the degree of Doctor of Industrial Medicine. The university's Kettering Laboratory of Applied Physiology, Dr. Robert A. Kehoe, director, is the central unit of the institute. Cooperating with the laboratory staff will be faculty members of the university's Colleges of Medicine, Law, Business Administration and Engineering. In addition, a group of physicians in industrial organizations will assist and make available their medical facilities. Applicants for admission will be screened to meet unusually high requirements for entrance and those accepted will be limited in number. The prerequisite for admission is graduation from an approved medical school plus at least two years of training in a hospital accredited by the American Medical Association for training resident physicians. A third year of practical experience in industry is advisable. Plans are under way with a number of industries to give further aid to the institute's program by financing fellowship grants for students. The Kettering Laboratory was founded by gifts from American industry to attack the hazards to life and health presented by new chemical and manufacturing processes.

OREGON

State Medical Meeting at Portland.—The Oregon State Medical Society will hold its annual session September 4-6 at the University of Oregon Medical School, Portland, under the presidency of Dr. Stanley Lamb, Portland. Among others, guest speakers include Dr. Clifford D. Sweet, Oakland, Calif., who will speak on the child as a patient; Dr. Hans Lisser, San Francisco, medicine; Dr. Henry N. Harkins, Seattle, vagotomy in the surgical treatment of peptic ulcer; Dr. Hyman Miller, Beverly Hills, Calif., diagnosis and treatment of clinical allergy. The annual banquet will be Friday at 7 p. m. at the Hotel Multnomah, where Dr. Raymond B. Allen, president, University of Washington, will speak on "Medicine and Our Changing Times."

PENNSYLVANIA

Night Calls.—The Lackawanna County Medical Society has begun a plan to make medical service available twenty-four hours a day. Persons unable to reach their regular physician during night hours can call the Medical Answering Service telephone number, and they will be given the name of a doctor available in their area. Police and telephone company officials have been notified so that medical service can be obtained in the shortest time. The service is maintained on a twenty-four hour basis.

Appointment to Psychiatric Committee.—Dr. J. Franklin Robisson, director, Children's Service Center of Wyoming Valley, Inc., Wilkes-Barre, has been named to the Committee on Child Psychiatry of the Group for the Advancement of Psychiatry. The formation of this group was recommended by the American Psychiatric Association as an unofficial advisory group, which in the next year or two will reconcile the standards and aims of the various organizations within the psychiatric field and propose a generally accepted program to the American Psychiatric Association. The Committee on Child Psychiatry will establish training and standards on practice and clarify the relationship between the procedures in child and adult psychiatry.

GENERAL

American Chemical Society Meeting.—The national meeting of the American Chemical Society will be held in New York, September 15-19, with general headquarters at the Hotel Pennsylvania, under the presidency of Dr. W. Albert Noyes Jr., chairman of the department of chemistry, University of Rochester, Rochester, N. Y. Eleven thousand chemists are expected to attend the eighteen professional divisions of the society.

Drs. Schwartz and Armstrong Win Essay Contest.—Drs. Steven O. Schwartz and Berthe E. Armstrong of the Hektoen Institute for Medical Research of the Cook County Hospital, Chicago, won the 1947 Mississippi Valley Medical Society essay contest. Their subject was "Treatment of Iron Deficiency (Hypochromic Anemia)." They will receive a cash award and will present their essay at the twelfth annual meeting of the Mississippi Valley Medical Society at Burlington, Iowa, October 1-3.

Anniversary of Sir Ronald Ross's Discovery.—The fiftieth anniversary of the discovery by Sir Ronald Ross of living and growing malaria parasites in the stomach wall of certain mosquitoes which had been allowed to feed on patients with malaria will be observed on August 25. With this discovery the enormously interesting and important scientific work on the prevention and better treatment of malaria was placed on a solid foundation. Sir Ronald Ross was a little known medical officer serving with the British army in the hinterlands of India when he made the discovery for which the Nobel Prize later was awarded to him.

Centennial Speeches by Clergymen Available on Records.—The speeches at the religious observance which opened the American Medical Association centennial have been recorded, and phonograph records can be made available if there is sufficient interest in the medical profession in having these records. The three sermons (see p. 1478) by Monsignor Fulton J. Sheen, Rabbi Joshua Loth Liebman and Rev. Ralph C. Hutchison, in condensed form as delivered by radio, will be made available in three phonograph records of two sides each on vinylite plastic. Delivered in a cloth-bound album, the price will be $6, remittance to accompany the order. Address the Order Department, American Medical Association, 535 North Dearborn Street, Chicago 10.

Medical Record Librarians Meeting.—The annual conference of the American Association of Medical Record Librarians will be held September 7-12 at the Hotel Commodore, New York. Subjects to be discussed include the Future of Medical Records in the Army, Navy and Veterans' Hospitals; Uses of Mechanical Aids in the Medical Record Department; Procedure in Reorganization of the Medical Record Department; Methods of Organizing State and Local Associations; Medical Audit, Compilation of Statistics, Civil Service Recognition and Establishment of Job Classifications in Federal, State and County Hospitals. Friday afternoon there will be a panel discussion on Standard Nomenclature of Disease and Operations.

Extend Closing Date of Hygeia Suggestion Contest.—At the centennial session in Atlantic City in June a contest was opened with the object of obtaining suggestions for the improvement of *Hygeia*, the health magazine published by the American Medical Association. Thirty-seven prizes varying from $100 to $5 are available to winners in the contest. Those desiring to participate only need write a brief letter of one hundred words or less suggesting how to improve the editorial content, pictorial presentation, typography or other features of *Hygeia*. The closing date for the contest has been extended to September 30. Letters should be mailed to the editor, Hygeia, 535 North Dearborn Street, Chicago 10, before midnight September 30. *Hygeia* reserves the right to quote all or part of these letters. The judges will be a committee of officials of the American Medical Association. The contest is open to physicians, interns and medical students.

Annual Meeting of Hospital Association.—The forty-ninth annual convention of the American Hospital Association will be held September 22-25 with joint headquarters at the Jefferson and Statler hotels in St. Louis. "Major Factors Affecting the Hospital Economy" will be the subject for the opening general session. Speakers will include John H. Hayes, New York, association president; R. O. D. Hopkins, New York, executive director of the United Hospital Fund of New York; Alvin E. Dodd, New York, president of the American Management Association, and Leon H. Keyserling, Washington, D. C., economic adviser to President Truman. Other sessions of the convention convening simultaneously will be broken into four sections, on professional practice, administrative practice, hospital planning and plant operation, and special aspects of hospital administration. The final general session will be a discussion of all the special sessions under the topic "American Hospitals Today." The convention will conclude with a banquet and ball.

Prevalence of Poliomyelitis.—Reports of cases of poliomyelitis for the periods indicated have been received from the division of public health methods, U. S. Public Health Service:

Division and State	Week Ended Aug. 9, 1947	Week Ended Aug. 10, 1946	Week Ended Median, 1942-1946	Total to Aug. 9, 1947	Total to Aug. 10, 1946	Total * March 16, Aug. 9, 1947	Total * March 17, Aug. 10, 1946
New England:							
Maine	0	2	2	7	6	4	6
New Hampshire	0	8	0	6	47	2	46
Vermont	1	0	2	11	10	3	6
Massachusetts	11	9	9	44	32	37	28
Rhode Island	16	3	1	36	3	35	3
Connecticut	4	1	10	17	30	14	22
Middle Atlantic:							
New York	14	70	70	161	293	125	260
New Jersey	5	18	21	37	72	31	66
Pennsylvania	18	12	12	77	74	63	62
East North Central:							
Ohio	18	25	14	81	180	71	165
Indiana	2	21	12	36	69	20	64
Illinois	27	131	70	124	458	102	450
Michigan	14	74	8	76	167	52	159
Wisconsin	5	31	6	34	103	10	90
West North Central:							
Minnesota	4	360	7	53	983	40	982
Iowa	8	48	6	40	171	32	162
Missouri	2	80	5	41	278	31	271
North Dakota	8	24	2	31	73	26	73
South Dakota	1	70	0	3	117	1	117
Nebraska	23	41	5	76	149	69	148
Kansas	6	74	9	36	280	18	276
South Atlantic:							
Delaware	5	1	1	12	5	12	5
Maryland	1	2	2	20	21	14	19
District of Columbia	0	0	1	3	4	1	3
Virginia	4	5	5	33	40	23	34
West Virginia	5	3	3	14	23	10	20
North Carolina	3	2	5	38	50	23	43
South Carolina	0	1	2	9	17	8	14
Georgia	5	9	5	34	83	27	75
Florida	2	9	2	57	408	32	359
East South Central:							
Kentucky	0	8	6	20	51	19	48
Tennessee	5	17	12	40	56	28	47
Alabama	0	44	6	27	244	14	241
Mississippi	0	22	3	23	126	6	109
West South Central:							
Arkansas	2	17	5	34†	138	23	126
Louisiana	3	17	7	41	186	23	167
Oklahoma	1	40	18	25	171	14	165
Texas	7	34	34	112	581	87	553
Mountain:							
Montana	2	6	1	7	48	5	32
Idaho	9	0	0	39	6	29	6
Wyoming	1	18	0	7	38	4	37
Colorado	2	53	7	27	342	22	341
New Mexico	1	9	2	11	52	8	51
Arizona	1	5	3	16	43	13	40
Utah	1	7	7	7	27	2	21
Nevada	0	2	1	0	3	0	3
Pacific:							
Washington	8	17	13	43	106	35	73
Oregon	5	10	10	23	35	18	31
California	19	115	40	486	526	337	439
Total	279	1,575	...	2,235†	7,025†	1,623	6,558
Median, 1942-1946	...	....	701	3,614		3,217	

* Last two columns show reported incidence since approximate seasonal low week (week ended between March 15 and 21).
† Figures changed by corrected reports.

International Cancer Research Congress.—The fourth International Cancer Research Congress, sponsored by the American Association for Cancer Research and the Union Internationale Contre le Cancer, will meet in St. Louis September 2-7 under the presidency of Edmund V. Cowdry, Ph.D., director of cancer research, Barnard Free Skin and Cancer Hospital, and professor of anatomy, Washington University, St. Louis (THE JOURNAL, July 26, p. 1111).

At least thirty-four foreign nations have indicated that they will be represented at the congress. Official delegates of the United States are Dr. Leonard A. Scheele, Bethesda, Md., for the U. S. Public Health Service; Col. James P. Cooney, Washington, D. C., for the army; Comdr. Richard B. Williams, Washington, D. C., for the navy, and Dr. Cowdry; John J. Bittner, Ph.D., Minneapolis; William U. Gardner, Ph.D., New Haven, Conn.; Dr. Elise l'Esperance, New York, and Cornelius P. Rhoads, New York. Communications should be directed to Frank McGurk, secretary general, Fourth International Cancer Research Congress, 3427 Washington Avenue, St. Louis 3.

Obstetricians, Gynecologists and Abdominal Surgeons.—The fifty-eighth annual meeting of this group will occur at Hot Springs, Va., September 4-6, under the presidency of Dr. Alexander D. Campbell, Montreal, Canada. The foundation prizes thesis will be presented Thursday afternoon by Dr. Irwin H. Kaiser of the Carnegie Institution of Washington, on "Histological Appearance of Spiral Arterioles in the Endometrium of Rhesus Monkey, Baboon, Chimpanzee and Gibbon." The Joseph Price Oration will be delivered by Dr. William F. T. Haultain, consulting obstetrician and gynecologist, Royal Infirmary, Edinburgh, Scotland. Among others, those speaking by invitation are:

Dr. John L. Parks, Washington, D. C., Influence of Posture on Urinary Tract in Pregnancy.
Dr. Lucien R. Pyle, Topeka, Kan., Staphylococcus Aureus Hemolyticus Puerperal Mastitis and Infections in the Newborn.
Dr. H. Hudnall Ware, Richmond, Va., Late Extrauterine Pregnancy.
Dr. Albert W. Diddle, Dallas, Texas, Carcinoma of Cervix.

Resolution on Psychiatry and Religion.—At a recent meeting in Minneapolis, the Group for the Advancement of Psychiatry unanimously adopted a resolution which read, in part, We, as members of the Group for the Advancement of Psychiatry, believe in the dignity and integrity of the individual and that a major goal of treatment is the progressive attainment of social responsibility. We recognize as of crucial significance the influence of the home on the individual and the importance of ethical training in the home. We also recognize the important role religion can play in bringing about an improved emotional and moral state. The methods of psychiatry aim to help patients achieve health in their emotional lives so that they may live in harmony with society and with its standards. We believe that there is no conflict between psychiatry and religion. In the practice of his profession the competent psychiatrist will therefore always be guided by this belief.

This organization, formed in 1946, now comprises 126 members of the American Psychiatric Association. Dr. William C. Menninger, Topeka, Kan., is chairman; the secretary is Dr. Henry W. Brosin, 950 East Fifty-Ninth Street, Chicago 37.

CANADA

Centenary of College of Physicans and Surgeons.—The College of Physicians and Surgeons of the Province of Quebec will celebrate at the Windsor Hotel, Montreal, the centenary of its founding, September 10-11. Dr. Harold B. Cushing, Montreal, emeritus professor of pediatrics, McGill University Faculty of Medicine, Montreal, will speak on "The Changing Aspects of Medicine in the Province of Quebec" Wednesday evening. Dr. Joseph Albert LeSage, Montreal, editor emeritus of *L'Union Médicale du Canada*, will address the meeting Thursday afternoon on "The Centenary of the College of Physicians and Surgeons of the Province of Quebec." The president's reception and banquet will be held Thursday.

Marriages

ALEXANDER RANDALL IV, Philadelphia, to JOSEPHINE GIOVANNINA PERLINGIERO of Trenton, N. J., February 26.

CHARLES J. CROSS, Westerville, Ohio, to Miss Elizabeth Hunter in Fulda, Germany, March 29.

NORMA E. SCHOLZ, Marlette, Mich., to Mr. James W. Anderson at Bangkok, Siam, January 18.

FRANCIS SEYMOUR JONES, Madison, Wis., to Miss Frances Cross of Utica, N. Y., April 19.

ROBERT D. JOHNSON, Black River Falls, Wis., to Miss Priscilla McCartney of Cleveland May 3.

MARVIN JAMES NAMAN to Miss Gladys Elaine Peloian, both of Fresno, Calif., recently.

Deaths

Owing to the accumulation of material in other sections of THE JOURNAL, *the publication of obituaries has been somewhat delayed; hence the publication of four pages in this issue.*

Courtney Malcolm Smith ● Washington, D. C.; born in South Haven, Mich., Feb. 22, 1899; University of Oregon Medical School, Portland, 1933; later received the degree of doctor of public health from Yale University; senior surgeon, U. S. Public Health Service Reserve; member of the Oregon State Medical Society; since 1946 administrator, medical services (national medical director) of the American Red Cross, which he joined in 1944 as deputy medical director and director of disaster medical service; entered public health work in Clackamas County as health officer and later served as assistant health officer of Portland, Ore., after three years of private practice in Oregon City and Portland; served as health officer and director of maternal and child health for the Territorial Department of Health in Alaska with headquarters in Juneau; from April 1942 until his Red Cross appointment a medical officer in the Office of Civilian Defense; in May 1945 was given leave from the Red Cross to represent the U. S. Public Health Service with the Army's Strategic Bombing Survey and did a four months tour of duty in Germany; served for twenty-six months with the 63d Field Artillery in the United States and France during World War I; killed in the crash of a DC-4 airliner in the Blue Ridge mountains of Virginia June 13, aged 48.

Guy Henry Faget ● Medical Director, U. S. Public Health Service, New Orleans; born in New Orleans, June 15, 1891; Tulane University of Louisiana School of Medicine, New Orleans, 1914; served an internship at the U. S. Marine Hospital in New Orleans and then became resident physician at the Presbyterian Hospital; served as health and quarantine officer and as a private physician in British Honduras, where he had an opportunity to study many tropical diseases; entered the U. S. Public Health Service as a commissioned officer in the grade of assistant surgeon on Sept. 19, 1922; completed assignments in Marine hospitals and quarantine stations in Mobile, Ala., San Francisco, Seattle, Fort Stanton, N. M., New Orleans and Norfolk, Va.; fellow of the American College of Physicians; member of the International Leprosy Association; in 1946 served as chairman of the section on therapeutics at the Pan American Conference on Leprosy in Rio de Janeiro; at the centennial session of the American Medical Association in 1947 at Atlantic City, N. J., awarded the silver medal for his exhibit on chemotherapy of leprosy; consultant to the advisory medical board of the Leonard Wood Memorial Fund; served as medical officer in charge of the National Leprosarium in Carville, La.; affiliated with the U. S. Marine Hospital, where he died July 17, aged 56, of injuries received when he accidentally fell from the fifth story window.

Frank Heady Lamb ● Pacific Palisades, Calif.; born in Crawfordsville, Ind., April 11, 1877; Miami Medical College, Cincinnati, 1901; professor emeritus of pediatrics at the University of Cincinnati College of Medicine; formerly instructor of physiology at the Harvard Medical School in Boston; professor of physiology and physiologic chemistry at his alma mater, where he had been assistant professor of pediatrics; specialist certified by the American Board of Pediatrics; member of the Ohio State Medical Association, Cincinnati Academy of Medicine and the American Academy of Pediatrics; past president of Central States Pediatric Society; served during World War I; formerly attending pediatrician to the Cincinnati General, Christ's, Good Samaritan, St. Mary's, Deaconess and Children's hospitals and the Children's Home; died June 4, aged 69, of virus pneumonia.

Harry W. Woodruff ● Joliet, Ill.; born in Joliet, Ill., in 1868; College of Physicians and Surgeons of Chicago, 1892; also a graduate in pharmacy; specialist certified by the American Board of Ophthalmology; member and formerly the vice president of the American Academy of Ophthalmology and Otolaryngology; past president of the Will-Grundy Counties Medical Society and the Chicago Ophthalmological Society; formerly professor of ophthalmology at his alma mater and the Chicago Eye, Ear, Nose and Throat College; for many years on the staff of the Illinois Eye and Ear Infirmary in Chicago; member of the board of directors, Y. M. C. A., and chairman of the local chapter of the American Red Cross; on the staff of the Silver Cross Hospital, where he died June 20, aged 79.

Clement Coleman Fenton ● Morgantown, W. Va.; born in New York in 1892; Cornell University Medical College, New York, 1925; professor of pathology and clinical pathology at the West Virginia University School of Medicine; diplomate of the National Board of Medical Examiners; past president of the Monongalia County Medical Society; president of the Association of Pathologists of West Virginia; fellow of the American College of Physicians; member of the American Association of Pathologists and Bacteriologists and the American Society of Clinical Pathologists; lieutenant commander, U. S. Naval Reserve, not on active duty; served during World War I; on the staff of the Monongalia General Hospital; died May 28, aged 54, of coronary occlusion.

Valentine William Murray Wright, Philadelphia; born in Buffalo, Feb. 2, 1897; University of Buffalo School of Medicine, 1919; associate in surgery at the University of Pennsylvania School of Medicine; fellow of the American College of Surgeons; in 1924 awarded the cross of the chevalier of the Order of George I by King George of Greece for his work among the Greek refugees in Turkey; chief, oncologic service, and tumor research worker in cancer, Biochemical Research Foundation, Franklin Institute; visiting surgeon, Hospital of the University of Pennsylvania; acting chief of the surgical division, Philadelphia General Hospital, where he died May 14, aged 50, of carcinoma of the larynx.

George Bourne Farnsworth, Damariscotta, Maine; born in Roxbury, Mass., in 1880; Harvard Medical School, Boston, 1907; in 1910 became assistant professor of obstetrics at the Western Reserve University School of Medicine and obstetrician to the Maternity Hospital in Cleveland, where he remained until 1930; served during World War I; in 1930 elected a trustee and since 1937 president of the board of the Gould Academy in Bethel; president of the Bingham Associates Fund, which was founded to advance rural medicine in Maine; fellow of the American College of Surgeons; on the staff of the Miles Memorial Hospital; died May 22, aged 67, of coronary disease.

Andrew M. Gamble, Maryville, Tenn.; born in 1867; University of Tennessee Medical Department, Nashville, 1899; mayor of Maryville; county health officer from 1900 to 1904; member of the state board of health from 1912 to 1915; chairman and medical examiner for the local exemption board during World War I and surgeon to the Student Army Training Corps at Maryville College; served as a member of the board of commissioners and as city alderman; on the staff of the Maryville College Hospital; director of the Bank of Maryville; died in St. Mary's Hospital, Knoxville, May 30, aged 79.

Forrest LeRoy Schumacher ● Pittsburgh; born in Hazleton, Pa., Dec. 12, 1885; University of Pennsylvania Department of Medicine, Philadelphia, 1908; assistant professor of radiology at the University of Pittsburgh School of Medicine; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; on the staffs of the Homestead (Pa.) Hospital and the Suburban General Hospital in Bellevue, where he died June 2, aged 61, of carcinoma of the lung.

John W. Anderson, Dallas, Texas; Meharry Medical College, Nashville, Tenn., 1885; died May 30, aged 86, of locomotor ataxia.

Peter James Brown, Conyers, Ga.; Atlanta School of Medicine, 1908; member of the American Medical Association; died in the Crawford W. Long Memorial Hospital, Atlanta, May 24, aged 66, of coronary occlusion.

Owen M. Carroll, New Castle, Ky.; Kentucky School of Medicine, Louisville, 1890; member of the American Medical Association; past president of the Shelby County Medical Society; for many years secretary of the Henry County Medical Society and county health officer; served on the staff of the King's Daughters Hospital at Shelbyville; in 1945 presented with the E. M. Howard medallion for meritorious professional and public service; died May 29, aged 76, of pneumonia and cardiac decompensation.

Rolland Augustus Case, Cleveland; Cleveland Homeopathic Medical College, 1901; served as vice president of the Academy of Physical Medicine; died May 23, aged 72, of coronary heart disease.

Samuel William Cloqe, Gouverneur, N. Y.; University of the City of New York Medical Department, New York, 1885; member of the American Medical Association; after fifty-one years as secretary of the Medical Society of the County of St. Lawrence, made secretary emeritus; died June 3, aged 90, of chronic myocarditis.

Edwin Grey Cope ● Hornersville, Mo.; St. Louis College of Physicians and Surgeons, 1910; past president of the Dunklin County and Southeast Missouri Medical societies; served on the school board; on the staff of the Presnell Hospital in Kennett, where he died May 28, aged 65, of heart disease.

Clarence Vincent Costello ● Holland, Mich.; University of Buffalo School of Medicine, 1911; fellow of the American College of Surgeons; formerly instructor in surgery at the University of Rochester School of Medicine and Dentistry; an officer during World War I; served on the staffs of the Strong Memorial, Rochester General, St. Mary's, Monroe County and Rochester State hospitals, all in Rochester, N. Y.; on the staff of the Holland Hospital; died in Los Angeles May 31, aged 60, of carcinoma of the esophagus.

William Wilhelm Craven, Charlotte, N. C.; University of Maryland School of Medicine, Baltimore, 1903; member of the American Medical Association; died May 15, aged 68, of coronary thrombosis.

James Lester Davis, Unionville Center, Ohio; Starling Medical College, Columbus, 1906; member of the American Medical Association; died in St. Francis Hospital, Columbus, May 5, aged 77, of intestinal obstruction.

William Davis ● St. Paul; Harvard Medical School, Boston, 1880; an Affiliate Fellow of the American Medical Association, serving as a member of the House of Delegates in 1903 and 1904; past president of the Ramsey County Medical Society and the Minnesota State Medical Association; at one time member of the state board of medical examiners; died May 9, aged 93, of fracture of the hip and malnutrition.

Alfred Desrochers, Adams, Mass.; Albany (N. Y.) Medical College, 1895; on the courtesy staff of the St. Luke's Hospital in Pittsfield; on the staffs of the North Adams (Mass.) and the Plunkett Memorial hospitals; died May 13, aged 80, of coronary thrombosis and pernicious anemia.

James Edwin Dewey, Springfield, Mo.; Rush Medical College, Chicago, 1903; interned at the Frisco Hospital in Springfield and St. Mary's Hospital in Kansas City; member of the American Medical Association; past president of the Greene County Medical Society; served during World War I; on the staffs of St. John's and Burge hospitals and the Springfield Baptist Hospital, where he died May 23, aged 67, of coronary thrombosis.

Clyde Owen Donaldson ● Kansas City, Mo.; University Medical College of Kansas City, 1900; past president of the Jackson County Medical Society; member of the American College of Radiology; served in France during World War I; died in St. Joseph Hospital May 25, aged 69, of cerebral occlusion.

Harold Sparrow Dorrance, Rochester, N. Y.; Harvard Medical School, Boston, 1920; member of the American Medical Association and the Rochester Academy of Medicine; on the staff of the Highland Hospital; died May 21, aged 55, of coronary thrombosis.

Charles M. Eckler, Williamstown, Ky.; Kentucky School of Medicine, Louisville, 1908; member of the American Medical Association; member of the Selective Service Board during World War II; for many years medical examiner for the Southern Railway; served on the board of education of Williamstown and the county board of health; director of the Bank of Williamstown; past president of the Rotary Club; died June 7, aged 67, of heart disease.

Alton Le Roy Flanders, Boston; University of the City of New York Medical Department, 1893; died April 16, aged 83, of cerebral hemorrhage.

Edgar Arthur Forsyth, Buffalo; Niagara University Medical Department, Buffalo, 1889; member of the American Medical Association and the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; specialist certified by the American Board of Otolaryngology; on the staffs of the Millard Fillmore, Emergency, Our Lady of Victory and Charity Eye, Ear, Nose and Throat hospitals; died May 25, aged 79, of uremia.

Alfred Edward Foster, Wilkes-Barre, Pa.; Baltimore Medical College, 1910; member of the American Medical Association; died in the General Hospital May 29, aged 69, of cerebral hemorrhage.

Walter Thompson Garfield ● Boston; Harvard Medical School, Boston, 1909; professor of dermatology and syphilology emeritus at the Tufts College Medical School; specialist certified by the American Board of Dermatology and Syphilology; member of the New England Dermatological Society; consultant, Norwood (Mass.) and Long Island hospitals; on the staffs of the Evangeline Booth Maternity Hospital, Cambridge City (Mass.) Hospital and the Boston City Hospital, where he died May 31, aged 55, of cerebral thrombosis.

William Leak Gilbert, Atlanta, Ga.; Atlanta Medical College, 1888; Jefferson Medical College of Philadelphia, 1891; member of the American Medical Association; served as health officer of Fulton County and as a member and chairman of the board of county commissioners; died May 7, aged 81.

Harry Theodore Harding, Washington, D. C.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1893; member of the American Medical Association; died in the Garfield Memorial Hospital May 28, aged 77, of diabetes mellitus.

John R. Heath ● Grover Hill, Ohio; Starling Medical College, Columbus, 1887; served as president and secretary of the Paulding County Medical Society, president of the Tri-County Medical Society, comprising Paulding, Van Wert and Mercer counties, coroner of Pike County and health commissioner of Paulding County; died May 24, aged 88, of cerebral hemorrhage.

Olly J. Henslee, Cincinnati; Medical College of Ohio, Cincinnati, 1894; at one time affiliated with the Good Samaritan and General hospitals; died May 22, aged 80, of heart disease.

Alfred Webb Herron, Vinita, Okla.; Arkansas Industrial University Medical Department, Little Rock, 1891; member of the American Medical Association; on the staff of the Eastern Oklahoma Hospital; served as president of the Bank of Adair; died May 16, aged 76, of coronary thrombosis.

Frank Hussy Jackson ● Houlton, Maine; Columbia University College of Physicians and Surgeons, New York, 1901; fellow of the American College of Surgeons; member of the New England Surgical Society; medical examiner for Aroostook County; served during World War I and World War II as an examining physician for the local draft boards; on the staff of the Aroostook Hospital; served as chairman of the editorial board of the *Maine Medical Journal;* died May 16, aged 70.

Jacob Kaszer, Plymouth, Ind.; College of Physicians and Surgeons of Chicago, 1886; served as county coroner; died May 28, aged 91, of senility.

Abraham Joseph King, Indianapolis; Indiana Medical College, School of Medicine of Purdue University, Indianapolis, 1907; died June 17, aged 84, of cerebral hemorrhage and chronic myocarditis.

Harry Hartung Kleinberger ● Millburn, N. J.; University of Cincinnati College of Medicine, 1931; police surgeon for many years; on the staffs of the Orange (N. J.) Memorial Hospital and the East Orange (N. J.) General Hospital; died in the Sinai Hospital in Baltimore June 5, aged 43, of uremia.

Otto F. Krueger, Milwaukee; Wisconsin College of Physicians and Surgeons, Milwaukee, 1896; died June 4, aged 71, of carcinoma of the tongue.

George Ludwig Laporte ● New York; Columbia University College of Physicians and Surgeons, New York, 1894; served as assistant professor of clinical medicine at his alma mater; on the consulting staff of the Lenox Hill Hospital; died June 16, aged 73, of arteriosclerosis and chronic myocarditis.

Everton Jay Lawrence, Windermere, Fla.; Western Reserve University Medical Department, Cleveland, 1905; died in the University Hospital, Cleveland, June 19, aged 70, of hypertension and heart disease.

Robert Rickards Leach, Oil City, Pa.; University of Rochester School of Medicine and Dentistry, 1945; died June 3, aged 30.

Albert Washington Lewis, Copperhill, Tenn.; University of Nashville Medical Department, 1901; member of the American Medical Association; died May 16, aged 72, of Parkinson's disease and acute nephritis.

William J. Loler, St. Louis; Barnes Medical College, St. Louis, 1899; died in Indio, Calif., April 28, aged 71, of cerebral hemorrhage.

Edward G. Lukemeyer, Huntingburg, Ind.; Louisville (Ky.) Medical College, 1885; past president of the Du Bois County Medical Society; director of the First National Bank; surgeon for the Southern Railway; died May 26, aged 87, of angina pectoris.

Harold Cleveland Lyman, Utica, N. Y.; New York Homeopathic Medical College and Flower Hospital in New York, 1917; affiliated with the Memorial Hospital; died May 20, aged 54, of acute myocarditis and calculous pyonephrosis.

Patrick George McCabe ● Fond du Lac, Wis.; Milwaukee Medical College, 1912; served during World War I; past president of the Fond du Lac County Medical Society; on the staff of St. Agnes Hospital, where he died May 17, aged 63, of general peritonitis secondary to pneumonia.

Donald Ellison MacGregor ● Indianapolis; Chicago College of Medicine and Surgery, 1917; served during World War I and later with the Army of Occupation in Germany; on the staff of the Methodist Hospital, where he died June 20, aged 55, of carcinoma of the esophagus with metastasis to the liver and lungs.

Donald Ross MacIntyre, Negaunee, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1905; fellow of the American College of Surgeons; member of the medical staff of the Cleveland-Cliffs Iron Company; died in the Morgan Heights Sanatorium in Marquette June 5, aged 65, of tuberculosis.

Sherman Logan McKinney, Huntingburg, Ind.; University of Louisville Medical Department, 1912; member of the American Medical Association; also a graduate in pharmacy; served overseas during World War I; affiliated with St. Mary's Hospital in Evansville; a director of the First National Bank, where he had been president; died in the Norton's Infirmary, Louisville, May 29, aged 59, of cardiac failure.

Julian Yerkes Malone ● Milwaukee; Washington University School of Medicine, St. Louis, 1921; served with the Chemical Warfare Service during World War I; on the staffs of the Columbia Hospital, Children's Hospital and Mount Sinai Hospital, where he died June 10, aged 54, of hypertension.

Sheridan Waterman Mattox ● Marion, Ohio; Eclectic Medical Institute, Cincinnati, 1896; past president of the Marion Academy of Medicine; served during World War I; served on the board of health; died May 24, aged 78, of cerebral hemorrhage.

Matthew Taylor Mayes, Springfield, Mass.; Dartmouth Medical School, Hanover, N. H., 1903; for many years a member of the state board of registration in medicine; died June 2, aged 76, of coronary thrombosis.

Charles Joseph Mengis, Buffalo; Niagara University Medical Department, Buffalo, 1897; died April 27, aged 72, of hypertension and cerebral hemorrhage.

Washington Merscher ● Clifton Springs, N. Y.; University of Pennsylvania School of Medicine, Philadelphia, 1910; formerly instructor in medicine and volunteer assistant in the cardiac clinic at the Temple University School of Medicine in Philadelphia, where he was on the staff of the Germantown Hospital and from 1932 to 1937 lecturer on medical diseases at the Germantown Hospital Nurses Training School; affiliated with the Clifton Springs Sanitarium; died June 15, aged 58, of coronary thrombosis.

Charles Albert Miller, Las Cruces, N. M.; College of Physicians and Surgeons, Baltimore, 1897; member of the American Medical Association; served as president and councilor of the Fourth District of the New Mexico Medical Society; past president, Dona Ana County Medical Society; for many years physician for the Selective Service; member of the school board; jail physician; died May 13, aged 76, of chronic myelogenous leukemia.

Thomas Moate, Gridley, Ill.; Northwestern University Medical School, Chicago, 1897; member of the American Medical Association; died May 31, aged 75, of coronary thrombosis.

George Washington Morgan, Yerkes, Ky.; University of Louisville Medical Department, 1911; died May 17, aged 66.

Herman Alfred Morrill, Gardner, Mass.; University of Vermont College of Medicine, Burlington, 1925; member of the American Medical Association; served overseas during World War I; affiliated with the Hospital Cottages for Children at Baldwinsville and the Henry Heywood Hospital, where he died May 28, aged 48, of rheumatic heart disease.

John Reid Morrison ● Bellingham, Wash.; Trinity Medical College, Toronto, Ont., Canada, 1902; member of the medical advisory board of Whatcom County during World War I; fellow of the American College of Surgeons; served as president and vice president of the Washington State Medical Association; on the staffs of St. Luke's Hospital and St. Joseph's Hospital, where he died April 8, aged 73, of chronic myocarditis and diabetes mellitus.

Albert Carl Muccilli, Duluth, Minn.; Marquette University School of Medicine, Milwaukee, 1944; interned at the Naval Hospital, National Naval Medical Center in Bethesda, Md.; served in the medical corps of the U. S. Naval Reserve during World War II; accidentally drowned at Boulder Lake while fishing May 15, aged 26.

Francis Albert Muccilli, Duluth, Minn.; Marquette University School of Medicine, Milwaukee, 1944; interned at St. Mary's Hospital in Detroit; served in the medical corps, Army of the United States, during World War II; accidentally drowned at Boulder Lake, May 15, aged 29, while fishing.

John Leslie Murphy, El Paso, Texas; University of Michigan Medical School, Ann Arbor, 1928; diplomate of the National Board of Medical Examiners; fellow of the American College of Surgeons; on the staffs of the City-County Hospital, Hotel Dieu, Sisters' Hospital and the Southwestern General Hospital; died May 2, aged 44.

James Anthony O'Connor ● North Tonawanda, N. Y.; University of Buffalo School of Medicine, 1919; served during World War I; for many years associated with the De Graff Memorial Hospital; died April 9, aged 49, of nephritis and hypertension.

Elmer Benjamin Packer, Toulon, Ill.; Jefferson Medical College of Philadelphia, 1899; served during World War I; member of the city council and board of education; affiliated with the Kewanee (Ill.) Public Hospital; died May 27, aged 82, of diabetes mellitus.

Howard Simmons Paine, Miami, Fla.; Albany (N. Y.) Medical College, 1881; fellow of the American College of Surgeons; for many years on the staff of the Glens Falls (N. Y.) Hospital; died May 5, aged 90, of pneumonia.

Dominick Andrew Palmisano ● New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1913; on the staffs of the Eye, Ear, Nose and Throat Hospital, Hotel Dieu, Women's Dispensary and Charity Hospital; died April 21, aged 59.

Walter Edward Patrie, Blackfoot, Idaho; Ensworth Medical College, St. Joseph, 1899; member of the American Medical Association; served overseas during World War I; for many years county health officer; died May 18, aged 69, of coronary occlusion and hypertension.

Richard Sebastian Pearse, Brooklyn; New York Homeopathic Medical College and Hospital, New York, 1902; served in France during World War I; died in the Kings County Hospital April 19, aged 71, of cerebral thrombosis and hypertensive cardiovascular disease.

George Winchester Penn, Humboldt, Tenn.; Vanderbilt University School of Medicine, Nashville, 1884; died May 20, aged 82, of coronary thrombosis.

George Emery Percy, Salem, Mass.; Boston University School of Medicine, 1879; died May 28, aged 88, of arteriosclerosis and heart disease.

Sophus George Peterson ● Rutland, Ill.; Rush Medical College, Chicago, 1897; served on the school board; served on the staff of St. Mary's Hospital in Streator; died May 5, aged 72, of coronary thrombosis.

Willis Staats Pomeroy, Gallupville, N. Y.; Kentucky School of Medicine, Louisville, 1904; died April 20, aged 75, of osteoarthritis, gangrene of both legs and arteriosclerosis.

Louis John Porstmann, Davenport, Iowa; Barnes Medical College, St. Louis, 1898; member of the American Medical Association; served on the staff of the Mercy Hospital; died in the Henry Ford Hospital, Detroit, May 21, aged 82, of cerebral thrombosis.

Ulysses Grant Powers, Evanston, Ill.; Medical College of Indiana, Indianapolis, 1894; died May 17, aged 82, of angina pectoris.

Peter James Reynolds, Dwight, Ill.; Rush Medical College, Chicago, 1894; affiliated with St. Mary's Hospital in Streator; died in Chicago June 6, aged 77, of coronary thrombosis.

Valentin Rothermel, Chicago; Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin, Prussia, 1923; died May 22, aged 53, of carcinoma of the rectum with metastases.

William Sidney Rowles, Hudson, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1940; interned at the Bellevue Hospital in New York; served a residency at the Greenwich (Conn.) Hospital; affiliated with the Veterans Hospital in Newington, Conn.; served during World War II; died in Stockport May 31, aged 32, of a fractured skull received in an automobile accident.

Charles Edwin Schlappich, Birdsboro, Pa.; Baltimore Medical College, 1908; member of the American Medical Association; served as chief deputy coroner, president of the board of health and director of the First National Bank; on the staff of St. Joseph Hospital in Reading, where he died May 14, aged 65, of injuries received in an automobile accident.

Charles Edward Scofield ● Brooklyn; Columbia University College of Physicians and Surgeons, New York, 1899; fellow of the American College of Surgeons; served as president of the Kings County Medical Society; senior surgeon to the Brooklyn Eye and Ear Hospital; otolaryngologist, House of St. Giles the Cripple; died May 18, aged 70.

Alexis Clynton Scott ● Cleveland; University of Wooster Medical Department, Cleveland, 1898; died in the Lakeside Hospital April 21, aged 72, of hypertensive cardiovascular disease.

Henry Clifford Sherer, South Norwalk, Conn.; University of the City of New York Medical Department, New York, 1892; member of the American Medical Association; served as health officer; member of the board of education and board of health; on the staff of the Norwalk Hospital, where he died May 26, aged 78, of myocarditis.

William Erasti Sherman ● Winter Haven, Fla.; Birmingham Medical College, 1915; served during World War I; died May 31, aged 58, of pulmonary tuberculosis.

Louis A. Shultz ● Rockford, Ill.; the Hahnemann Medical College and Hospital, Chicago, 1892; died May 17, aged 79, of coronary occlusion.

Jacob D. Smith, Shelbina, Mo.; Rush Medical College, Chicago, 1870; member of the American Medical Association; died May 8, aged 98.

Lloyd Ernest Smith ● San Bernardino, Calif.; College of Medical Evangelists, Los Angeles, 1925; affiliated with the Loma Linda (Calif.) Community and St. Bernardino hospitals; died in Glendale May 1, aged 57, of heart disease.

Henry Curtis Butler Snow, Buzzards Bay, Mass.; Tufts College Medical School, Boston, 1897; examining physician for the local draft board during World War II; served as school physician and a library trustee; died May 27, aged 70, of uremia.

Ludwig R. Sommer, Chicago; Universität Heidelberg Medizinische Fakultät, Baden, Germany, 1920; member of the American Medical Association; affiliated with St. George's Hospital; died May 17, aged 55, of carcinoma of the stomach.

Aaron Burleigh Spahr, War, W. Va.; Medical College of Virginia, Richmond, 1926; member of the American Medical Association; first lieutenant, medical reserve corps, not on active duty; died in the Norburn Hospital, Asheville, N. C., April 20, aged 49, of portal cirrhosis.

William E. Sparks, Sandy Hook, Ky.; Kentucky School of Medicine, Louisville, 1907; veteran of the Spanish-American War; died in Bruen May 31, aged 73.

Rufus Franklin Spears, Meridian, Miss.; Louisville National Medical College, Medical Department State University, 1911; died May 13, aged 60, of chronic myocarditis and acute bronchitis.

Joseph Y. Spinuzza, Buffalo; University of Buffalo School of Medicine, 1925; member of the American Medical Association; captain in the medical corps, Army of the United States, during World War II; affiliated with the Columbus Hospital; died April 21, aged 48, of subacute bacterial endocarditis.

Robert Franklin Steele, Chicago; Chicago College of Medicine and Surgery, 1913; died in St. George Hospital May 25, aged 60, of coronary thrombosis.

Emerald Jasper Steen ● Fullerton, Calif.; College of Medical Evangelists, Los Angeles, 1920; past president of the Orange County Medical Society; chairman of the staff of the Fullerton Hospital; died near Gorman April 24, aged 52, of injuries received in an automobile accident.

Olaf Martin Steffenson ● Chicago; Marion-Sims College of Medicine, St. Louis, 1899; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; formerly on the staff of the Chicago Eye, Ear, Nose and Throat Hospital; died June 3, aged 68.

John Bethune Stein, New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1892; professor emeritus of physiology at the New York University College of Dentistry; died May 16, aged 77.

Albert Russell Stephens, Delta, Ala.; Southern Medical College, Atlanta, 1888; member of the American Medical Association; died May 9, aged 89.

John Lewis Tamisiea ● Missouri Valley, Iowa; State University of Iowa College of Medicine, Iowa City, 1896; formerly member of the state board of health; served as a member of the city council and as president of the People's State Bank of Missouri Valley; died May 10, aged 81, of coronary thrombosis.

Walter McCreary Taylor, Ovid, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1913; served during World War I; died in the Mercywood Hospital, Ann Arbor, May 8, aged 61, of nephritis and heart disease.

Loyd Thompson, San Diego, Calif.; University of Arkansas School of Medicine, Little Rock, 1910; at one time city bacteriologist at Little Rock, where he had been pathologist at St. Vincent's Hospital; formerly on the staff of St. Joseph's Infirmary in Hot Springs National Park, Ark.; served during World War I and later as a colonel in the medical reserve corps of the U. S. Army; author of several books; at one time editor of the *American Journal of Syphilis*; died May 21, aged 64.

Lawson Lorenzo Truax ● Klamath Falls, Ore.; St. Louis College of Physicians and Surgeons, 1906; fellow of the American College of Surgeons; past president of the Klamath County Medical Society; on the staff of the Klamath Valley Hospital; died in Gold Beach April 27, aged 65.

Lister H. Tuholske ● St. Louis; Washington University School of Medicine, St. Louis, 1909; past president of the Washington University Medical Alumni Association; served on the staffs of the Jewish, Deaconess, De Paul and Missouri Baptist hospitals; died May 2, aged 60.

George Theron Van Voorhees, Lomita, Calif.; Eclectic Medical Institute, Cincinnati, 1893; served on the staff of the San Pedro Hospital, where he died April 16, aged 76, of pneumonia.

Claude Milton Vaughan ● Paris, Ky.; Kentucky School of Medicine, Louisville, 1908; served during World War I; on the staff of the Massie Memorial Hospital; president of the Bourbon County Medical Society; died April 10, aged 63, of metastatic melanosarcoma.

Feodor Von Raitz, New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1890; died March 13, aged 87.

Clark Woodworth Wakefield ● Pittsburgh; Jefferson Medical College of Philadelphia, 1917; served during World War I; died in the Western Pennsylvania Hospital April 23, aged 52, of myocardial infarction.

Coburn Elder Walden, Flint, Mich.; Howard University College of Medicine, Washington, D. C., 1926; died in the Hurley Hospital May 21, aged 46, of pulmonary tuberculosis.

Ellis David Walker, Lynchburg, Va.; Detroit Homeopathic College, 1906; died May 6, aged 84, of senility.

James Francis Walsh ● Bridgeport, Conn.; Columbia University College of Physicians and Surgeons, New York, 1919; fellow of the American College of Surgeons; on the staff of St. Vincent's Hospital; died in Chicago June 11, aged 51, of coronary occlusion.

De Forrest Emanuel Walters, Elizabethtown, Pa.; Jefferson Medical College of Philadelphia, 1901; died in the Masonic Homes Hospital April 28, aged 70, of carcinoma of the colon and bronchopneumonia.

Frank Ryan Warden, Adamsville, R. I.; College of Physicians and Surgeons, Baltimore, 1889; died May 28, aged 8., of coronary thrombosis.

Joseph Samuel Webster ● Gallipolis, Ohio; Miami Medical College, Cincinnati, 1899; died May 25, aged 73, of coronary occlusion.

Joseph Elliott Wellman, Port Huron, Mich.; Detroit College of Medicine, 1905; past president of St. Clair County Medical Society; member of the American Medical Association; member of the board of the Port Huron General Hospital, where he died May 8, aged 69, of a hip fracture and other injuries received in a fall.

John McElroy White, Jackson, Miss.; Vanderbilt University School of Medicine, Nashville, Tenn., 1876; died May 21, aged 89, of senility.

David Lloyd Williams, Denver; Wisconsin College of Physicians and Surgeons, Milwaukee, 1911; served during World War I; died May 1, aged 66.

Robert Price Woods ● Altheimer, Ark.; Medical Department of Tulane University of Louisiana, New Orleans, 1904; veteran of the Spanish-American War; died in Pine Bluff, May 9, aged 69, of injuries received in an automobile accident.

Walter C. Woodward ● Seattle; Harvard Medical School, Boston, 1904; at one time city physician; fellow of the American College of Surgeons; past president of the Seattle Surgical Society and the King County Medical Society; on the staff of the Swedish Hospital, where he died May 3, aged 70, of arterial hypertension.

Foreign Letters

MADRID

(From Our Regular Correspondent)

July 5, 1947.

A Course on Infectious Diseases

Dr. L. Zamorano, head of the pathology department at the National Hospital for Infectious Diseases, has just given a course on infectious diseases in the Institute of Medical Pathology directed by Dr. Gregorio Marañon before large audiences of physicians and students. His lectures, which are to be published, were magnificent, especially those dealing with atypical pneumonia, sepsis, typhoid and salmonellosis. In the talk on exanthematic typhus, he spoke from experience in the latest epidemic in Madrid, where he studied 42 postmortems from the points of view of anatomy and histology and found, in addition to the typical lesions already described by others, further nonspecific lesions which were related to the symptomatology (myocarditis, encephalitis, hepatitis). In another paper, on visceral leishmaniasis, he described certain granulomatous formations in the lung very similar to miliary tuberculosis but without any caseation and with Donovan bodies inside the macrophages, which he was the first to call attention to. Dr. Zamorano's fellow workers in this course of lectures on infectious diseases were Drs. A. Duque Sampayo (circulatory system and infectious diseases), F. Vega Diaz (endocarditis lenta), E. Lopez Vidriero (diphtheria), J. Martinez Diaz (poliomyelitis), J. Gimena (brucellosis), L. Arteta and Professor Marañon, who gave the closing lecture, "the febricular syndrome," in which he gave a review with especial reference to his recent findings in connection with hypothalamic and endocrine syndromes in general.

Institute of Medical Research

Dr. C. Jimenez Diaz, professor of internal medicine in the Faculty of Medicine of Madrid University, took steps in 1934 to set up an institution for clinical investigation, with the financial support of private capital, and he succeeded in organizing an Institute of Medical Research which opened in the Madrid University City in July 1936. The outbreak of the civil war immediately afterward interrupted the work planned, because the University City was right on the battlefield throughout the three years of war. Already the institution had been included in the University of Madrid and two floors had been allotted to it.

Some of the institute's earliest collaborators are now in exile working in other research centers: Dr. Severo Ochoa is now professor of pharmacology in University College, New York; Dr. Felipe Moran now works in the Medical Clinic of the Railway Hospital at Buenos Ayres; Dr. F. Bielschowsky is engaged in a scientific center at Sheffield, England.

After the civil war Professor Jimenez Diaz gathered his collaborators together again in a new building where, so far, useful work has been done. A number of new men have joined Professor Jimenez Diaz. At present they are functioning in the institute sections of physiology under Dr. Francisco Grande Cobian, biochemistry under Dr. H. Castro Mendozoa, bacteriology and immunology under Dr. Emilio Arjona and experimental pathology under Dr. P. De La Barreda. Affiliated with this institute are the hospital services directed by Professor Jimenez Diaz, of which the heads are Drs. J. Rof Carballo, E. Lopez Garcia and J. Parra Lazaro, with subsections attached to them.

The institute was entrusted by decree of the director general of public health in 1941 to study problems connected with feeding the Spanish people and, by ministerial order issued since the war, it has become a part of the Cajal Trust of the Higher Council for Scientific Research. Studies have been made on lathyrism, metabolism of the lipoids, the lipotropic action of choline, allergy and other subjects. With Dr. F. De Castro's collaboration they have proved that the experimental muscular dystrophy produced by avitaminosis E corresponds to an alteration of the myoneural synapsis (increase of cholinesterase in the muscles of dystrophic rabbits). P. de la Barreda is now focusing attention on experimental hypertension, and recently they have found that the artery wall plays a part in hypertension, producing an enzymatic substance which, when acting on the blood plasma, gives rise to a hypertensive principle. This fact has been designated by C. Jimenez Diaz in a recent paper as "internal secretion of the arteries."

Dr. F. Grande Cobian and Dr. Oya have done work on the metabolism of carbohydrates and the importance of certain intermediary products (pyruvic acid and citric acid) in their utilization. These papers have appeared in the *Anales del Instituto de Investigaciones Médicas* and are republished, as they come out, in the *Revista Clinica Española.*

Anti-Insulinic Substances of Pancreatic Origin

In the Institute of Experimental Medicine of the Higher Council for Scientific Research Dr. J. L. Rodriguez-Candela, along lines which he started with Dr. L. Bauman at Columbia University, is working on the possible existence of anti-insulinic substances of pancreatic origin. He proved, seven months before Thorogood, that dogs with alloxanic diabetes require much more insulin to compensate their diabetes than after the removal of the pancreas. He has proved in a second experiment that this is not due to any disturbance in the absorption of nutritive elements, since, if we tie the pancreatic ducts in a dog with alloxanic diabetes, the animal does not vary in weight and does not need more insulin if pancreatic ferments are administered (the author gives raw pancreas); if, after some time, when the islet pancreatic tissue has become atrophied, the whole of the remaining pancreas is removed, he observes that the need of insulin diminishes. In a later paper he shows that this anti-insulinic activity is stimulated by acetylcholine. He has ascertained that the ocular complications of alloxanic diabetes are not due to lack of insulinic compensation; they are due to a modification of the plasma proteins (beta-globulins), with a lessening of the complementary power of the serum, which may explain why diabetic patients have so little resistance to infection. This lessening of the complementary power of the serum improves after the administration of amino acids, and even more, after that of a pancreatic extract devoid of hypoglycemic activity. Dr. J. L. Rodriguez-Candela's papers have appeared in volume 29 of the *Anales de la Academia Medico-Quirurgica Española* (1945-1946), and the latest ones have come out in the *Revista del Institute Nacional de Ciencias Medicas* (Madrid).

Studies on Tuberculosis

Professor M. Tapia, for many years director of the National Hospital for Infectious Diseases (formerly Hospital del Rey), left Spain during the civil war and went to Portugal, where he has been carrying out studies on tuberculosis at the Caramulo Sanatorium. A product of his studies in Portugal is the book Formas Anatomoclinicas, Diagnostico y Tratamiento de la Tuberculosis Pulmonar (Porto, Artes Graficas, 1939, and two later editions). It is probably the most complete tome in the world on tuberculosis and it is a subject of pride for us that it is written in Spanish.

After several years' residence in Portugal, he has been allowed to come to Spain several times; on his latest two visits he lectured on tuberculosis. The first lecture was entitled "Extrapleural Pneumothorax" and the second "Tracheobronchial Tuberculosis." These have been mentioned in a previous letter.

His latest book, La tuberculosis traquobronquial (Lisbon, Livraria Luso-Española, 1946), is the first contribution in Spanish to our knowledge on the subject. He sets forth the part played by bronchial tuberculosis in the various stages of tuberculosis of the respiratory tree, its symptomatology and its treatment. He devotes a chapter to bronchial tuberculosis in relation to collapsotherapy and indicates with great precision the conditions in which bronchial tuberculosis is a decisive factor and what treatment should be followed. The book is enriched with many clinical records from Caramulo, and tomographic pictures, a method of radiologic examination by means of which he often establishes a precise diagnosis and is able to localize the bronchial lesions without resorting to bronchoscopy.

To our sorrow, this book was written in exile, and those of us who see Dr. Tapia coming and going deeply regret that he has not accepted the invitation extended by the Spanish authorities to take up his post again as director of the National Hospital for Infectious Diseases.

TURKEY

(From Our Regular Correspondent)

ANKARA, July 10, 1947.

The New University Law

With the enactment of the university law in June 1946 universities in Turkey became independent, self-governing institutions. When the Istanbul University, which had functioned since 1909, was reorganized in 1933 it retained its scientific freedom but lost its independence and self government and came under the jurisdiction of the Ministry of Education, which from then on decided on matters of administration, the appointment of the faculty, changes therein, the curriculum and other matters of instruction. As a result of the dynamic leadership and the untiring efforts of its president (1943-1946), Dr. Tevfik Saglam, who drafted the bill and introduced it through the Ministry of Education, it recovered its independence and made the other universities self-governing bodies.

The law has eighty-one articles. It determines the president, the senate, the faculty, the committees, the relationship of departments to other universities, the status of the faculty members engaging in private practice, indemnities, duties of assistants, instructors and interpreters, matters of discipline, employees, governmental control and matters of finance.

There are three universities in Turkey, the Istanbul University, the Istanbul Technic University and the Ankara University. At its inception in 1909 the Istanbul University consisted of the Medical School, the School of Law, the School of Literature, the School of Mathematics and the School of Theology, the latter becoming extinct with the advent of the republic. Founded in 1827, the Medical School is the oldest. The School of Political Science was established in 1866 and is a separate institution. The Istanbul School of Engineering, which was established in 1872, has been a separate university for the past five years. The Ankara University comprises the Medical School, the School of Law, the School of Literature and the School of Science. The School of Political Science at Ankara and the Ankara Conservatory are independent institutions; so are the Schools of Commerce and Economics at Istanbul and Smyrna. A bill has been introduced which will give university status to the Ankara Institute of Agriculture, which includes the School of Agriculture, the Veterinary School and the School of Forestry.

During 1946-1947 the Istanbul University had an enrolment of 11,158, of which 3,077 were medical, 2,394 law, 2,171 science, 2,130 literature, 1,068 economics, 161 pharmacy and 157 dentistry students. Of the medical students 261 are taking the one year preparatory course in physics, chemistry and biology at the School of Science; the remaining 2,916 are taking the five year course at the Medical School; of these 1,472 are civilians and 312 are women; 714 students are living at the student homes provided by the Ministry of Health. At the homes they receive free board and maintenance, are provided with every article of clothing and all textbooks and receive a monthly allowance and free tuition, in return of which they are to serve the government after graduation; 318 students are living at the dormitories provided by the army medical corps.

According to the new law an indemnity is granted professors who abstain from engaging in private practice. A full time professor receives 400 pounds in addition to his monthly salary, a full time associate professor 300 pounds and a full time assistant professor 200 pounds. At official occasions university professors follow the supreme court, the council of state and the court of finance and precede all ministries. University professors are not subject to the age limit; if their physical and mental condition permits, they may teach until 70 or 75 years of age. The Istanbul University 1947 budget is 11,622,501 Turkish pounds, on the staff are 99 Turkish and 36 foreign professors, 98 assistant professors, 269 assistants, 34 lecturers, 6 interpreters at the disposal of the foreign professors, 5 monitors, 11 foreign lecturers, 21 foreign technicians and 3 instructors, a total of 582 staff members; of these the Medical School has 41 Turkish and 6 foreign professors, 33 assistant professors and 120 assistants. The three classes of the Ankara University Medical School established in 1945 consists of 235 civilians, 39 women, 101 students at the dormitory of the Ministry of Health and 165 army medical students.

Sources of income of university, faculty and university unions and organizations are (*a*) government appropriations, (*b*) provincial and municipal appropriations and appropriations from societies, (*c*) fees derived from organizations affiliated with the university or a faculty, (*d*) fees derived from societies or persons engaged in research or consultation at the university, faculty or affiliated institutions, (*e*) income derived from publications, (*f*) the income from property in real estate owned by the university, faculty or affiliated institutions, (*g*) income from institutes, laboratories, clinics and outpatient departments, (*h*) income from profits made in investments, (*i*) donations and bequests.

Every year the ministries concerned in cooperation with the ministry of education and in consultation with the universities decide on the number of students to be admitted either as dormitory students or as students receiving a scholarship and on qualifications of these students other than general, which have to be published one month in advance of registration. All expenses such as registration fees, tuition fees and fees for board and maintenance, laboratory and examination fees and fees for diplomas of university dormitory or scholarship students are to be borne by the respective universities or administration.

Under the presidency of the minister of education the president and dean of each university elect from among their group for a duration of two years a member to the senate of each university. The report on the senate is to be made by one of the general secretaries of the university where the senate is in session and who has been charged with this duty by the minister of education, who, if need arises, indicates the locality where the senate is to meet.

The minister of education is in supreme authority over all the universities. Presiding over the interuniversity council, he exercises governmental control over the universities, the faculties and the committees; he investigates and approves matters

relating to universities and faculties and if necessary recommends reexamination of decisions.

In agreement with the general assembly of faculty professors, the president has authority to entrust professors, associate professors and assistant professors to pursue scientific investigations or temporarily engage in research work at another university within the country or abroad either personally or as a director of scientific or professional matters.

BUENOS AIRES

(From Our Regular Correspondent)

July 17, 1947.

Resignations and Retirements in the Faculties of Medicine

The following titular professors resigned their chairs in the Faculty of Medical Sciences of Buenos Aires: Drs. Alberto Zwanck (hygiene), Neiro Rojas (legal medicine), Mariano R. Castex (clinical medicine), Alberto Peralta Ramos (obstetrics) and Juan P. Garrahan (pediatrics) and retired. Drs. Nicholás Romano (clinical medicine) and Pedro Baliña (dermatology and venereal diseases), among others, were asked to resign.

In the Faculty of Medicine of Rosario the following titular professors, among others, were removed from their chairs: Drs. David Staffieri (clinical medicine), Juan M. González (pathology), Juan T. Lewis (physiology), Enrique Roncoroni (anatomy) and J. M. M. Fernández (clinical dermatology).

The Federation of Organizations for the Defense and Progress of the Autonomic Democratic University prepared an alphabetical list of professors and auxiliary docent teachers of the six national universities who retired or were either declared "in cessation" or resigned during the period which began on the date of intervention in schools by the law of May 3, 1946. The list includes more than 1,150 professors and auxiliary personnel belonging to the following faculties: the Faculty of Medical Sciences of the University of Buenos Aires, 10 who were declared in cessation, 9 who retired and 28 who resigned; from the University of Cordoba, 8 in cessation, 4 who retired and 137 who resigned; from the University of La Plata, 9 who retired, 6 who resigned and 2 who were removed from their chairs; from the University of Litoral (Rosario), 14 who were declared in cessation and 322 who resigned. The list includes, with respect to the University of Buenos Aires, only professors and not auxiliary docent personnel.

Among the 26 titular professors of medicine and odontology recently appointed in Buenos Aires are Drs. Juan M. Muñoz (physiology), Manuel L. Pérez (clinical obstetrics, normal parturition), José W. Tobias (clinical medicine, fourth chair), Saúl I. Bettinotti (puericulture, early infancy), Juan R. Beltrán (legal medicine) (consequently he renounced his chair of history of medicine), Enrique D. U. Pierángeli (clinic of nutrition), Ricardo E. Dónovan (surgical pathology), Fernando M. Bustos (surgical clinic, third chair), Adolfo F. Landivar (surgical clinic, first chair), Antonio R. Vergara (clinical otolaryngology) and Germinal Rodríguez (hygiene and social medicine).

Institute of Medical Investigation

The Institute of Medical Investigation for Promoting Scientific Medicine, which is a private institution supported by well-to-do persons of Córdoba, was recently inaugurated in Córdoba City. It is devoted to investigation on the basic branches of medicine for purely scientific purposes. Its creation is due to the separation of Dr. Oscar Orías from his chair of physiology of the Faculty of Medical Sciences of Córdoba as well as of his collaborators because of the separation of Professor Houssay, of whom Dr. Orías was a pupil.

Drs. Oscar Orías and Enrique Moisset de Espanés are director and subdirector respectively of the institute, which has sections on pharmacology, chemistry, histology and optical recording of cardiovascular activity. Studies are now available on cardiovascular physiology under the direction of Dr. O. Orías, on pharmacology, especially on active principles of autochthonous South American plants, for instance fagarine (see THE JOURNAL March 12, 1946 and Jan. 18, 1947) under the direction of Dr. E. Moisset de Espanés, on the sexual and reproductive aspects of endocrinology under direction of Dr. Inés L. C. de Allende, and on the physiopathologic mechanism of allergy under the direction of Dr. L. Giscafré.

This institute is the second of its type. The first one was created in Buenos Aires in 1944 under the direction of Professor B. A. Houssay. The latter was created for the same reasons as the former. There were speeches at the inaugural ceremonies. Dr. B. A. Houssay spoke on "Scientific Investigations in Argentina." He said that fundamental scientific investigations are developed in universities or else in private or industrial institutions. The best progress is obtained in the last two, which offer the possibilities of working free from bureaucratic obstacles. The opening of the new institution is an important event in Córdoba, a city of unusual intellectual culture and the cradle of the first university of Argentina.

Examination of Pregnant Women for Tuberculosis

Through a law of the Buenos Aires municipality pulmonary x-ray examination of pregnant women for tuberculosis is to be obligatory and free of any cost to the patients. The examination will be performed on pregnant women who report for the first consultation to the consulting offices of municipal maternity hospitals. The proposed measures are of great value in the crusade against tuberculosis, as they offer proper treatment to tuberculous pregnant women and their babies. From now on tuberculous patients will occupy special sections of municipal maternities.

BRAZIL

(From Our Regular Correspondent)

SÃO PAULO, July 16, 1947.

Antineoplastic Action of a Fungus

Before the Sociedade Medica São Lucas, Dr. Juvenal R. Meyer of the Instituto Biologico de São Paulo referred to the antineoplastic action of the adult form of Polyporus cinnabarinus, called by Brazilian people "orelha de pau" (ear of wood). This property is similar to the antineoplastic action found by the same author in cultures of Penicillium notatum according to a paper read some time ago before the same society, in which he pointed out the characteristics of the active substance against a transplantable tumor of the mouse.

The reproduction of this type of tumor is prevented by an aqueous extract of Polyporus cinnabarinus, while pieces of the same tumor treated under the same temperature (4 C.) during an equal period of time (seventy-two hours) maintained all their neoplastic activity.

The aqueous extract is prepared by boiling 1 part of the adult forms of the fungus with 5 or 6 parts of water for five to ten minutes. Its activity is maintained from four to six days at a temperature of 4 C. and after treatment by heat at 98 C. for thirty minutes. This antineoplastic activity is partially or completely lost when the aqueous extract is treated by animal proteins or by alkaline solutions. This may be the reason for the antineoplastic decreasing action when the extract is injected into mice bearing the tumor; it enters into contact with animal proteins before reaching the tumor.

An Indian doctor has published a paper on similar action shown by a fungus, perhaps the same Polyporus cinnabarinus that exists in Brazil.

Dr. Morris Fishbein in São Paulo

During his short visit in São Paulo Dr. Morris Fishbein of Chicago visited the Hospital da Santa Casa de Santos on July 6, the Asilo Santa Terezinha de Carapicuiba and the Escola Paulista de Medicina on July 7. Dr. Fishbein also visited the Hospital das Clinicas, the Faculdade de Saude Publica and the Instituto Pinheiros and in the evening addressed the Associação Paulista de Medicina on the theme "One Hundred Years of Medical Progress."

AUSTRALIA

(From Our Regular Correspondent)

May 26, 1947.

Medical Service in Australia

The introduction of a scheme for nationalization of medicine in Australia, while costing £45 million yearly, would break no new ground in the field of health. At best it might extend the scope of treatment offered people unable to pay or living in isolated areas. The government could, however, render valuable service at comparatively low cost by branching out in the direction of positive or protective health. At present, such expenditure is insignificant. Most of the organizations set up in this field have insufficient funds to be fully effective. These are the views of the economic adviser to the Queensland government, published in the *Economic News*, a monthly bulletin issued by the Queensland Bureau of Industry.

Private activities (with governmental subsidies) have been able to provide adequate medical treatment and health insurance facilities, but they have neither the power nor the scope to provide positive or protective measures. These must be developed by impersonal public authorities. Therefore this should be the first avenue for increased public activities. This would reduce the need for hospitals and medical care until the time arrives when economic conditions will permit the large expenditure that will be necessary for the socialization of all medical activities. Extensions in this field should include the elimination of substandard housing, large scale schemes for the eradication of mosquitoes and other pests and the elimination of earth closets. Some local authorities have already done splendid work in this field, but it is not nearly far reaching enough. Also diagnostic facilities to assist in checking the development of disease might be established. Experience in the late war showed the value of universal low cost x-ray examinations and periodic medical checks. Such a scheme applied to the whole community would result in the early notification of dangerous symptoms and the checking of disease. This might be done in schools, universities, factories and shops. A national scheme, when it is introduced, must be comprehensive. Charges made against the British scheme are its failure to provide appliances and artificial units, nursing and specialist services, and to cover maternity; also its excessive limitations on the prescription of drugs. The detailed organization of any national medical scheme adopted is a matter for consultation and determination by those who have had professional experience. However, to the layman the most advantageous system seems to be one wherein the patient's contact with the doctor is through a group clinic working in conjunction with laboratory specialists, general hospitals staffed by specialists, and less expensively equipped hospitals for subacute, convalescent and chronic cases. This system offers the patient a free choice of, say, fifteen to twenty doctors and enables consultations to be held with specialized doctors without additional visits. It offers doctors adequate laboratory and research facilities and avoids excessive expenditure on equipment, since the apparatus installed in hospitals now restricted to serious cases would be more fully utilized.

Institute of Dental Research in Sydney

Out of the appointment of a director of the laboratories of pathology, bacteriology and biochemistry to the United Dental Hospital, Sydney, in August 1946, has grown the Institute of Dental Research. The Hospitals Commission of New South Wales has provided £5,000 to establish and equip the institute, the objects of which are to promote research in dental science and a focus for the scientific activities of dentistry. The library covers all branches of medical and dental science. One of the functions of the library is a discussion group. A routine pathologic service for the dental hospital is provided. This service is available also to the general dental practitioner, who will be able to have complete laboratory examinations made for his patients.

A paper on the relation between exposed pulps and infection by the poliomyelitis virus has been published by the institute. Several others on the relation between oral bacteria and dental caries and its relation to Australian dietaries is proceeding; and an inquiry is being made into a technic for serologic identification of oral strains of yeast.

The institute is not under any financial burden for the current year, but any expansion of its activities will depend on the availability of a considerably increased income.

Graduate in Social Studies Appointed to Hospital

The first appointment of a graduate in social studies to a Queensland public hospital has been made. The appointee will be responsible for following up the medical history of children after their discharge from the hospital and will assist in attempting to find the causes of diseases produced under various economic and domestic conditions. She will assist in finding accommodation for parents of sick children who come from country districts and will investigate school records of certain types of children. It is proposed to introduce into the Queensland University next year a course in social studies which will cover economics, philosophy, history, industrial relations, physiology, nutrition and lectures on existing facilities for social service work.

New Record Low for Infant Mortality

New Zealand has established a new world's record for the mortality of infants during the first year of life. For 1946 the rate was 25.35 per thousand live births. Queensland also has a new low record for the state. For 1945 the rate was 29.67 per thousand live births. For 1944 the rate was 31.32 and in 1943 it was 37.79. For Australia the 1945 rate was 29.4. For comparison, the Australian infant mortality rates have been 115.3 for 1891, 103.6 for 1901, 68.5 for 1911, 65.7 for 1921, 42.1 for 1931 and 39.7 for 1941.

Personal Items

Dr. A. J. Canny, former senior pathologist and acting director of the Kanematsu Institute of Pathology, Sydney Hospital, has been appointed to the chair of pathology, University of Queensland.

Dr. W. Simmonds, lecturer in pathology at the University of Queensland, has been awarded a Nuffield demonstratorship in physiology at the Oxford Medical School. The appointment is for three years, for which period Dr. Simmonds has been granted leave of absence.

Mr. G. P. S. Bpissard, B.Sc., lecturer in physiology, has resigned following the award to him of the Bayliss-Starling studentship (1946-1947) by the University College, London.

Dr. W. A. Wunderly has been appointed director of the new tuberculosis division of the commonwealth department of health. He has studied extensively in Europe and North America.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Naturopath as "Duly Licensed and Practicing Physician" Within Meaning of Sickness Insurance Policy.—The plaintiff sued for actual and punitive damages alleged to be due because of the defendant's failure to make weekly indemnity payments under a sick benefit policy. From a judgment for the plaintiff, the defendant appealed to the Supreme Court of South Carolina.

The policy written by the defendant insurance company agreed to pay the plaintiff weekly sickness benefits on the conditions stated in clause 6 of the policy, namely "Weekly benefits for sickness will be paid for each period of seven consecutive days while the insured is totally disabled by sickness from performing or giving any attention whatever to his or her usual or other occupation; and necessarily confined to bed and there visited professionally by a duly licensed and practicing physician. A certificate must be furnished by the insured and signed by the physician at the beginning of each week of such disability, setting forth the nature of illness and probable duration."

The matter came before the court on exceptions which raised the single question of whether or not the plaintiff complied with the aforementioned provision of the policy requiring attendance "by a duly licensed and practicing physician" and the issuance of a certificate by such physician at the beginning of each week of the alleged disability. The evidence showed that plaintiff was attended by a practitioner of that school of medicine which is known as naturopathy and that the required physician's certificate on which the plaintiff based his claim was signed by such practitioner. It is the defendant's contention that such a practitioner is not a "duly licensed and practicing physician" within the meaning or contemplation of the provision quoted.

At the time the plaintiff's claim arose, said the Supreme Court, the practitioner in question was certainly a "naturopathic physician" within the specific language of the South Carolina statutes enacted in 1937 which permit the practice of naturopathy in the state. He was practicing his profession within the indicated field and in the absence of anything in the record to show the contrary, he must be deemed to have been duly licensed. He was, then, a duly licensed and practicing naturopathic physician and was therefore an eligible or qualified practitioner to sign the certificate required by defendant's policy, unless the fact that he was a naturopathic physician, instead of merely a "physician," disqualified him. Naturopathy, continued the court, is one of a number of fields in the art of healing which have been recognized by the general assembly as accepted processes of preventive and curative medicine. Any one engaged in the practice of any of such branches of medicine, after having been duly licensed, stands for all purposes in the position of a physician in the orthodox field of medicine, at least to the extent that he limits his activities to the recognized scope of his particular profession. An osteopath, a homeopath, a chiropractor, a magnetic healer and a naturopath are alike practitioners in the field of medicine, and it appears to us, concluded the court, to be straining at a gnat to enter into a discussion of distinctions between a "practitioner of medicine" and a "physician."

Having regard to the various specialties in the field of medicine recognized by the general assembly, including naturopathy, and to the unwillingness of the defendant to accept the certificate of a naturopath, it may be that the defendant can make special provisions in its policies requiring that claims will be paid only when certified by practitioners who are licensed in the field of materia medica, major surgery, and etc. And they might except from their policies any liability arising out of, or concurrent with, the violation by a naturopath or other practitioner of the limitations of his profession. But there are no such limitations in the present policy. At most there is an ambiguity arising out of the use of the word "physician" when the defendants might have used a term of more limited significance.

In conclusion, the court said that, while this is not in any sense controlling, we may advert to the fact that it is a matter of common knowledge that the people who purchase sick benefit policies of the industrial type constitute a large proportion of the patrons of practitioners of such branches of healing as naturopathy, and that it is generally believed by such people that they are dealing with licensed practitioners of medicine. In this belief they are encouraged by legislation authorizing such practice. It would be unjust, under such circumstances, to deprive these people of contract rights by means of a limitation on the meaning of the word "physician" to exclude the types of medical practice which to them are acceptable. Accordingly the judgment in favor of the plaintiff was affirmed.—*Williams v. Capital Life & Health Insurance Company, 41 S. E. (2d) 208 (S. C., 1947).*

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and the Examining Boards in Specialties were published in THE JOURNAL, Aug. 2, page 1198.

BOARDS OF MEDICAL EXAMINERS

ARKANSAS:* *Examination.* Texarkana, Nov. 6-7, 1947. Sec., L. J. Kosminsky, Texarkana.

ARKANSAS: *Eclectic.** Little Rock, Nov. 6. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Written.* Los Angeles, Aug. 25-28. *Oral.* Los Angeles, Nov. 8-9. Sec., Dr. Frederick N. Scatena, 1020 N. St., Sacramento 14.

DISTRICT OF COLUMBIA:* *Endorsement.* Washington, Sept. 8. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6012 Municipal Bldg., Washington.

GEORGIA: Atlanta, Oct. 14-16. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta 3.

ILLINOIS: Chicago, Oct. 14-16. Supt. of Registration, Dept. of Registration and Education, Mr. Philip M. Harman, Springfield.

INDIANA: *Examination.* Indianapolis, June 1948. Sec., Board of Medical Registration and Examination, Dr. Paul R. Tindall, K of P Bldg., Indianapolis.

KENTUCKY: *Examination.* Louisville, Sept. 22-24. Sec., State Board of Health, Dr. P. E. Blackerby, 620 S. Third St., Louisville 2.

MINNESOTA:* St. Paul, Sept. 3-5. Sec., Dr. J. F. DuBois, 230 Lowry Medical Arts Bldg., St. Paul.

MISSISSIPPI: *Endorsement.* Jackson, Dec. 1947. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MONTANA: Helena, Oct. 6-8. Sec., Dr. O. G. Klein, First National Bank Bldg., Helena.

NEVADA: Carson City, Nov. 3. Sec., Dr. G. H. Ross, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, Sept. 11-12. Sec., Board of Registration in Medicine, Dr. John S. Wheeler, 107 State House, Concord.

NEW JERSEY: *Examination.* Trenton, Oct. 21-22. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO:* Santa Fe, Oct. 13-14. Sec., Dr. LeGrand Ward, 141 E. Palace Ave., Santa Fe.

NEW YORK: *Examination.* Albany, Buffalo, New York and Syracuse, Oct. 6-9, 1947. Sec., Dr. Jacob L. Lochner, Jr., Education Bldg., Albany.

RHODE ISLAND:* *Examination.* Providence, Oct. 2-3. Chief, Division of Professional Regulation, 366 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, Nov. 10-12. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

UTAH: *Reciprocity.* Oct. 8. *Examination.* Salt Lake City, June, 1948. Asst. Dir., Department of Registration, Miss Rena B. Loomis, 324 State Capitol Bldg., Salt Lake City.

WEST VIRGINIA: *Examination.* Charleston, Oct. 2-4. Commissioner, Public Health Council, Dr. N. H. Dyer, State Capitol, Charleston.

WYOMING: *Examination.* Cheyenne, Oct. 6. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

* Basic Science Certificate required

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Sept. 16. Sec., Mr. Francis A. Roy, Science Hall, University of Arizona, Tucson.

COLORADO: *Examination.* Denver, Sept. 17-18. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

DISTRICT OF COLUMBIA: *Examination.* Washington, Oct. 20-21. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6012 E. Municipal Bldg., Washington.

FLORIDA: *Examination.* Gainesville, Nov. 1. Final date for filing application is Oct. 16. Sec., Dr. W. M. Emmell, University of Florida, Gainesville.

MICHIGAN: *Examination.* Ann Arbor and Detroit, Oct. 10-11. Sec., Miss Eloise LeBeau, 101 N. Walnut St., Lansing.

MINNESOTA: *Examination.* Minneapolis, Oct. 7-8. Sec., Dr. Raymond N. Bieter, 105 M. Hall, University of Minnesota, Minneapolis.

NEBRASKA: *Examination.* Omaha, Oct. 7-8. Dir., Bureau of Examining Boards, Mr. Oscar F. Humble, State Department of Health, Room 1009, State Capitol Bldg., Lincoln 9.

OKLAHOMA: Spring 1948. Sec., Dr. Frank Clinton Gallaher, 813 Braniff Bldg., Oklahoma City.

OREGON: *Examination.* Portland, Sept. 6. Final date for filing application is Aug. 20. Sec., Board of Higher Education, Basic Science Examining Committee, Mr. C. D. Byrne, University of Oregon, Eugene.

TENNESSEE: *Examination.* Memphis, Sept. 18-19. Sec., Dr. O. W. Hyman, 874 Union Ave., Memphis.

WISCONSIN: *Examination.* Madison, Sept. 27. Final date for filing application is Sept. 20. Sec., Mr. William H. Barber, Watson and Scott Sts., Ripon.

Current Medical Literature

AMERICAN

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American Journal of Physiology, Baltimore

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Influence of Environmental Temperature on Dietary Requirement for Thiamine, Pyridoxine, Nicotinic Acid, Folic Acid and Choline in Chicks. C. A. Mills, Esther Cottingham and Elizabeth Taylor.—p. 376.

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Thermal Balance of Men Working in Severe Heat. S. Robinson and S. D. Gerking.—p. 476.

Archives of Surgery, Chicago

54:365-482 (April) 1947

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*Peritoneal Irrigation for Uremia Following Incompatible Blood Transfusion: Report of Case. E. E. Muirhead, A. B. Small and R. B. McBride.—p. 374.

Permanent Intubation of Thoracic Aorta. C. A. Hufnagel.—p. 382.

*Surgical Treatment of Peptic Ulcer: Recent Experience at Los Angeles General Hospital. H. L. Thompson and H. Prout.—p. 390.

Living Fascial Sutures in Inguinal Herniorrhaphy. E. A. Gaston.—p. 414.

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Progress in Orthopedic Surgery for 1945: X. Infantile Paralysis. C. E. Irwin.—p. 445.

Id.: XI. Infantile Paralysis: Research. J. A. Toomey.—p. 459.

Id.: XII. Poliomyelitis: Convalescent Treatment and Related Subjects. R. L. Bennett.—p. 476.

Peritoneal Irrigation for Uremia Resulting from Incompatible Blood Transfusion.—Muirhead and his associates report a case of uremia following acute renal damage due to an incompatible blood transfusion. The prognosis seemed poor until the procedure of peritoneal irrigation was instituted according to the technic of Frank, Seligman and Fine. The amount of urea cleared from the body by this procedure was comparable to that reported by these observers. The urea clearance was taken as a measure of the clearance of other substances. Overhydration constituted one of the main complications, as the kidneys were not able to discard water. This complication was accentuated by the use of Tyrode's solution and isotonic solution of three chlorides in the peritoneum. Recovery was associated with loss of water and salt from the body, while dextrose in distilled water was used for peritoneal irrigation. Substantial amounts of urea were obtained by this method, and the azotemia was greatly relieved. Subsequently the kidneys cleared large quantities of urea from the body, but polyuria was necessary, as the urea clearance remained depressed.

Surgical Treatment of Peptic Ulcer.—Thompson and Prout report the results of surgical treatment of peptic ulcer in the Los Angeles General Hospital. The study covers the two and one-half year period from Jan. 1, 1943 through June 30, 1945. During that time the diagnosis of peptic ulcer was made on 1,415 hospitalized patients. Of this group 1,108 patients, or 78 per cent, received medical treatment, and 307 patients, or 22 per cent, were treated surgically. This study was made by the method of sampling 100 unselected cases wherein acute perforation was the indication for surgical treatment and 50 unselected cases wherein elective operations were performed. The latter surgical procedures included partial gastrectomy, anastomotic operations and total gastrectomy. An overall mortality rate of 19.3 per cent does not appear too bad in the light of mortality figures of the past. The application of gastric resection, partial or total, in 86 per cent of the cases illustrates the trend toward radical operation in the treatment of peptic ulcer. Admittedly less effectual procedures such as gastrojejunostomy and gastroduodenostomy were, moreover, accompanied with higher mortality figures, being 25.5 per cent and 42.8 per cent respectively.

Journal of Bone and Joint Surgery, Boston

29:259-552 (April) 1947. **Partial Index**

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Trochanteric Arthroplasty in Treatment of Ununited Fractures of Neck of Femur. P. D. Wilson.—p. 313.

*Laminectomy and Foraminotomy with Chip Fusion: Operative Treatment for Relief of Low Back Pain and Sciatic Pain Associated with Spondylolisthesis. H. Briggs and S. Keats.—p. 328.

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"Latch" Graft: Combination of Inlay and Intramedullary Graft Which is Self Retaining. P. C. Rizzo and O. Lehmann.—p. 354.

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Secondary Closure of Wounds Associated with Compound Fractures. J. O. Barr.—p. 376.

Evaluation of Cortical and Cancellous Bone as Grafting Material: Clinical and Experimental Study. L. C. Abbott, E. R. Schottstaedt, J. B. deC. M. Saunders and F. C. Bost.—p. 381.

External Rotation of Leg in Poliomyelitis. S. C. Yachnin.—p. 415.

Symposium on Intervertebral Disk: Introduction. A. G. Davis.—p. 424.

*End Result Study of Intervertebral Disk. R. E. Lenhard.—p. 425.

*Ruptured Intervertebral Disk and Sciatic Pain. J. S. Barr.—p. 429.

Disk Factor in Low Back Pain With or Without Sciatica. J. G. Love.—p. 438.

*Pathologic Studies of Intervertebral Disks. C. Eckert and A. Decker.—p. 447.

Analysis and Differentiation of Low Back Pain in Relation to Disk Factor. A. Steindler.—p. 455.

*Anatomicophysiologic Aspects of Injuries to Intervertebral Disk. V. T. Inman and J. B. deC. M. Saunders.—p. 461.

Laminectomy and Foraminotomy.—Briggs and Keats treated 18 patients (8 females and 10 males aged between 13 and 53 years) surgically for the relief of backache and leg pain associated with spondylolisthesis. In 9 patients who presented no history of leg pain, the operation consisted in excision of the unfused laminas followed by a modified chip fusion. The second group of 9 patients included those who had pain of sciatic radiation in addition to low back pain indicative of nerve root involvement; in these patients the operation consisted in laminectomy, intervertebral foraminotomy and surgical fusion. The technic of the operation was concerned with two principal problems: first, stabilization of the weak link in the spinal column to relieve tension and strain on the associated muscles and ligaments and to prevent further progression of the subluxation and, second, relief of the nerve root oppression

responsible for the sciatic pain. All the 9 patients of the first group were relieved of pain and were able to return to work. Nerve root pressure was accounted for by a protruded intervertebral disk in only 1 of the 9 patients of the second group; the remaining 8 patients were relieved of pain when the involved intervertebral foramens were unroofed. The greatest permanent benefit and the most dramatic relief of pain is offered by a combination of laminectomy, intervertebral foraminotomy and chip fusion.

End Result Study of Intervertebral Disk.—Lenhard studied 843 patients operated on for removal of an injured intervertebral disk. Five hundred and sixty-six (67 per cent) of the patients were men and 277 (33 per cent) were women. The operation afforded good results in 67.5 per cent of the patients examined. In those not examined but surveyed by questionnaire, apparently good results had been obtained in 59.5 per cent. Twenty patients required multiple operations for recurrences in a series of 147 who returned for examination. Roentgenographic interpretations are not reliable for accurate localization of the lesion.

Ruptured Intervertebral Disk and Sciatic Pain.—Barr reports the results of operations on 380 patients for ruptured intervertebral disk pressing on one or more of the nerve roots of the lumbosacral plexus and causing low back and intractable sciatic pain during the five year period 1939 to 1943. End results were obtained for 139 patients on questionnaire only and for 95 patients on questionnaire and check-up examinations; these 234 patients include 102 with spine fusion and 132 without spine fusion. Comparison of the results in these two groups seems to indicate a modest but definite superiority of the results in fused cases over the unfused ones, when consideration is given to the factors of back pain and weakness, leg pain and weakness, and return to the type of work performed before the disability. One patient who had a spine fusion died of massive pulmonary embolism twenty-seven days after the operation. The localization of ruptured intervertebral disk by contrast myelography and the technic of its removal by partial laminectomy have become standard procedures. The thesis that every patient should have a spine fusion done at the time of laminectomy is tenable. Conservative treatment should be tried for a time before resorting to operative intervention. The principles of rest and immobilization, adequate sedation during the acute phase of the process and later protection of the lower part of the back from undue strain and postural rehabilitation appear to be the essential parts of a conservative regimen.

Pathologic Studies of Intervertebral Disks.—Eckert and Decker compared 182 intervertebral disks partially removed from 166 patients at operation with 40 lumbosacral intervertebral disks removed completely with their adjacent vertebral bodies from cadavers of different age groups at postmortem. It was apparent that the difference was in number rather than in kind. The principal changes encountered consisted of extensions of the tissue of the nucleus pulposus into the cartilaginous plate, vascularization of this defect, scarring with vascularization of the annulus fibrosus and nucleus pulposus, and granular degeneration considered the result of desiccation in the nucleus pulposus. At the time of the operation the disk was described as herniated, bulging or softened. No significant microscopic differences were found in the three groups. Follow-up studies on the surgical cases show good results in 86.7 per cent. The best results were obtained in those cases in which the disk was described at operation as herniated. No relation appears to exist between microscopic findings and end results.

Injuries to Intervertebral Disk.—Inman and Saunders divide their patients into three categories: 1. Patients with backache and local signs and symptoms of injury to the vertebral ligamentous structure presenting radiating pain, deep in character, extending down one or both extremities. Such patients should be considered as suffering from mechanical derangement of the spine and should be treated by immobilization and support. 2. Patients whose symptoms are identical with those found in the first group but who in addition give definite evidence of nerve root compression. Pain is relatively as prominent a phenomenon as the evidence of compression. Treatment should be directed toward the relief of pressure to prevent permanent damage to the affected nerve root. After removal of the herniated or displaced disk, additional measures are necessary to protect the injured and still painful ligamentous structures. 3. Patients whose symptoms of backache may be mild or lacking and in whom radiation of pain to the extremity is not extensive but signs of nerve compression are prominent. There is muscle weakness with atrophy, loss of sensation over the appropriate dermatome and reflex changes. Relatively few cases of herniated intervertebral disk fall in this category, but many of the spinal cord tumors do. Removal of the pressure agent and decompression of the nerve may be followed by almost complete dramatic recovery.

Journal of Experimental Medicine, New York

85:441-558 (May) 1947

Studies on Streptococcal Fibrinolysis: In Vitro Production of Fibrinolysin by Various Groups and Types of Beta Hemolytic Streptococci; Relationship to Antifibrinolysin Production. Commission on Acute Respiratory Diseases.—p. 441.

Neoplastic Potentialities of Mouse Embryo Tissues: Tumors Elicited from Gastric Epithelium. W. E. Smith.—p. 459.

Metabolism of Amino Acids and Casein Digest in Phlorhizinized Dogs. W. B. Hawkins, F. W. McKee, G. M. B. Hawley and A. J. Kummer. —p. 479.

Occurrence During Acute Infections of Protein Not Normally Present in Blood: IV. Crystallization of the C-Reactive Protein. M. McCarty. —p. 491.

Studies on Flexner Group of Dysentery Bacilli: Detoxification of Shigella Paradysenteriae by Means of Periodic Acid. W. F. Goebel.—p. 499.

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Antibacterial Properties of Sulfur. Julia T. Weld and Anne Gunther. —p. 531.

Antirickettsial Effect of Thionine Dyes: Use of Methylene Blue and Toluidine Blue to Combat Experimental Tsutsugamushi Disease (Scrub Typhus). O. L. Peterson and J. P. Fox.—p. 543.

Medical Annals of District of Columbia, Washington

16:173-230 (April) 1947

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Obligation of the Physician to Psychiatry. E. Klein.—p. 176.

Diathermy Machines. A. C. Stephens.—p. 180.

Intracranial Cholesteatoma, Epidermoid or Pearly Tumor: Report of a Case. E. E. De Angelis and Elizabeth Sammis De Angelis.—p. 183.

16:231-286 (May) 1947

Properties and Clinical Applications of Streptomycin Therapy. J. A. Kolmer.—p. 231.

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Modern Psychiatry in General Practice. L. M. Dub.—p. 247.

Medicine, Baltimore

26:115-220 (May) 1947

*Clinical Detection of Genetic Carriers of Inherited Disease. J. V. Neel. —p. 115.

Scientific Principles, Methods and Results of Chemotherapy, 1946. E. K. Marshall Jr.—p. 155.

The Viral Pneumonias and Pneumonias of Probable Viral Origin. H. A. Reimann.—p. 167.

Detection of Genetic Carriers of Inherited Disease.—According to Neel two classes of people transmit inherited disease to their progeny: (*a*) those who actually have the disease and (*b*) those who appear normal but whose genetic constitution includes determiners for the disease. "Genetic carriers" are those who may transmit an inherited disease to their progeny without themselves showing it. The carriers of the majority of inherited diseases cannot at present be identified clinically and are known only through the results of a progeny test. However, the transmitters of certain inherited diseases exhibit minor departures from the norm which make it possible to identify them clinically with varying degrees of certainty. Of the twenty-two diseases mentioned as manifestations of carriers, eleven affect the blood or skin. This disproportionate representation of dermatology and hematology is probably not entirely due to chance but reflects the ease with which blood and skin can be studied. From the standpoint of the present accuracy of identification of the carrier state, the diseases which have been considered fall into three groups. For five of the diseases described —gout, xanthomatosis, thalassemia, sickle cell anemia and congenital hemolytic jaundice—the diagnosis of a carrier state may

be made with considerable assurance. Certain rare dominant diseases, of which hereditary hemorrhagic telangiectasia is presented as a type form, also fall into this group, as does the sex linked type of retinitis pigmentosa. A second group of diseases is composed of epilepsy, diabetes, pernicious anemia and essential hypertension. Although many details remain to be worked out, it seems that a smaller proportion of the genetic carriers show recognizable changes than in the first group. The third group of diseases are rare and the factors that reveal the carrier state are of low specificity.

New England Journal of Medicine, Boston

236:683-728 (May 8) 1947

Benign and Malignant Tumors of Small Intestine. T. W. Botsford and R. E. Seibel.—p. 683.
*Vasomotor Disturbances in Poliomyelitis, with Special Reference to Treatment with Paravertebral Sympathetic Block. V. J. Collins, W. L. Foster and W. J. West.—p. 694.
Eruptive Fever Involving Skin and Mucous Membrane (Stevens-Johnson Disease). A. Patz.—p. 697.
Streptomycin: I. Bacteriologic and Pharmacologic Aspects. R. Murray, T. F. Paine and M. Finland.—p. 701.
Hemoglobinuric Nephrosis.—p. 713.
Adenoacanthoma of Cardia of Stomach.—p. 716.

236:729-772 (May 15) 1947

Bacterial Endocarditis Treated with Penicillin: Observations in 9 Cases. R. H. Jones and F. Tichy.—p. 729.
*Persistence of Remissions of Thyrotoxicosis After Cessation of Thiouracil Therapy. R. H. Williams, S. P. Asper Jr., W. F. Rogers Jr., J. D. Myers and C. W. Lloyd.—p. 737.
*Acute Brucellosis Among Laboratory Workers. C. Howe, E. S. Miller, Emily H. Kelly, H. L. Bockwalter and H. V. Ellingson.—p. 741.
*Streptomycin: II. Clinical Uses. T. F. Paine, R. Murray and M. Finland.—p. 748.
Adenocarcinoma of Jejunum.—p. 760.
Gallstone Ileus.—p. 763.

Vasomotor Disturbances in Poliomyelitis.—Collins and his co-workers employed sympathetic nerve blocks to alleviate vasomotor disturbances, such as edema, hyperhidrosis and coldness, with partial to complete relief in 17 adult convalescents of poliomyelitis. Lumbar paravertebral sympathetic block was performed on patients with involvement of the lower extremities, and stellate ganglion block on those with involvement of the upper extremities. Pain, muscle spasm and muscle tenderness were completely relieved in 3 of these patients between the ages of 20 and 32 years by sympathetic nerve blocks and without supplementary therapeutic measures, such as physical therapy and hot packs. It is suggested that pain, tenderness and muscle spasm in the acute phase of poliomyelitis also may be alleviated by sympathetic blocks.

Thyrotoxicosis.—Williams and his co-workers administered thiouracil or one of its derivatives to 111 patients with thyrotoxicosis. Fifty-one of these patients (46 per cent) the treatment of whom was discontinued had remissions that lasted from three to thirty-one months. Forty-four of these patients have been free of thyrotoxicosis for more than a year after cessation of therapy, and 33 have remained well for more than eighteen months. Of all the patients who remained well without treatment for more than a year, only 1 had a relapse. Following the cessation of treatment with thiouracil, 70 per cent of the patients who had a relapse had it within two months and 88 per cent had it within five months. The female sex, a small goiter and a mild degree of thyrotoxicosis tended to favor persistent remissions. The age of the patient, the duration of the disease and the nodularity of the thyroid gland were not observed to exert a significant influence, but these factors may prove important when larger series of cases are analyzed. The good effects obtained with thiouracil encourage the frequent use of its less toxic derivative 6-propylthiouracil in conjunction with small doses of potassium iodide in the treatment of thyrotoxicosis. The manifestations of thyrotropic activity appear to be important aids in regulating the duration of therapy.

Acute Brucellosis.—Howe and his co-workers report the occurrence of acute brucellosis in 10 men and 7 women between the ages of 21 and 28 who were laboratory workers engaged in investigative work with strains of Brucella suis and Brucella melitensis. Eleven patients were treated with sulfadiazine for periods of twenty to thirty days, 2 were given penicillin and sulfadiazine simultaneously, 3 were treated with streptomycin and 2 were given only symptomatic therapy. One patient who was given a course of sulfadiazine during a relapse following streptomycin therapy is included in both groups. From this limited clinical experience there was no indication that these drugs were of therapeutic benefit.

Clinical Uses of Streptomycin.—According to Paine and his co-workers, streptomycin has proved most effective in acute tularemia and in cases of meningitis due to gram-negative bacilli, especially Hemophilus influenzae. It is useful in most gram-negative bacillus infections, particularly those of the urinary and respiratory tracts. The results in some forms of tuberculosis are encouraging, and it is at present the best available chemotherapeutic agent for tuberculous infections. Typhoid, Salmonella infections and brucellosis have not responded favorably. It may be useful as a second line of defense in some cases of coccic infections that prove insensitive to the sulfonamides and penicillin or develop fastness to these agents. The greatest limitation to the clinical usefulness of streptomycin is the readiness with which most organisms develop resistance to it. The most serious untoward effect that has been noted is a disturbance in vestibular function following the use of large amounts of the drug over prolonged periods.

Surgery, St. Louis

21:605-772 (May) 1947. Partial Index

*Chemosurgical Treatment of Cancer of Ear: Microscopically Controlled Method of Excision. F. E. Mohs.—p. 605.
*Successful Suture of Abdominal Aorta for Arteriovenous Fistula. N. E. Freeman and A. H. Storck.—p. 623.
Evaluation of Basal Vascular Tone Test as Indication for Sympathectomy in Treatment of Surgical Lesions of Major Arteries. E. W. Rector.—p. 630.
Fluorescein Wheal Test for Collateral Circulation in Preoperative Evaluation of Patients with Aneurysms and Arteriovenous Fistulas. T. B. Massell.—p. 636.
Direct Measurement of Blood Pressure Within Arterial Aneurysms and Arteriovenous Fistulas. N. E. Freeman.—p. 646.
Method of Rapid Transfusion into Femoral Vessels in Patients Without Adequate Peripheral Superficial Veins. J. O. Shaffer.—p. 659.
Wound Healing Studies on Several Substances Recommended for Treatment of Burns. B. E. Brush, C. R. Lam and J. L. Ponka.—p. 662.
Treatment of Bedsores in Paraplegic Patients. B. S. Freeman.—p. 668.
*Acute Cholecystitis, with Special Reference to Occurrence of Jaundice. L. J. Lester.—p. 675.
Intrathecal Penicillin in Bacterial Meningitis. R. G. Livingstone and J. E. Leach.—p. 683.
*Intra-Arterial Penicillin in Surgical Treatment of Infections of Extremities. J. O. Shaffer.—p. 692.
Importance of Precise Bacteriologic Data in Treatment of Infections of Urogenital Tract. J. A. Lazarus and L. H. Schwarz.—p. 713.
Postgastrectomy Syndrome. D. Adlersberg and E. Hammerschlag.—p. 720.
Three Hundred and Seventy-Four Acute War Wounds of Thorax. C. B. Burbank, W. H. Falor and H. W. Jones Jr.—p. 730.
Six Subphrenic Spaces: Applied Anatomy and Surgical Considerations. P. Thorek.—p. 739.
Cotton versus Catgut as Suture Material in Herniorrhaphy. G. C. Engel and J. C. Reganis.—p. 746.

Chemosurgical Treatment of Cancer of Ear.—Mohs used the chemosurgical method for the microscopically controlled excision of cancer of the ear in 107 patients, 52 of whom had squamous cell carcinoma, while 55 patients had basal cell carcinoma. The rates of cure in the series of patients with squamous cell carcinoma of the ear were 80 per cent at 6 months or more, 74.2 per cent at 3 years or more, and 64.3 per cent at 5 years or more. The primary lesion was eradicated in 92 per cent of the patients. The rates of cure in the series of patients with basal cell carcinoma of the ear were 92.2 per cent at 6 months or more, 87.1 per cent at 3 years or more and 81 per cent at 5 years or more. The rate of cure at 3 years for basal and squamous cell carcinoma was 80.6 per cent and this record was attained despite the fact that in this series recurrent lesions constituted 32.3 per cent of the total. The reliability and the conservatism of the method are both due to the systematic microscopic control of excision afforded by the chemosurgical technic. Recurrent lesions after roentgen or radium therapy constitute prime indications for chemosurgery. It is suggested that the method had best be practiced as a specialty. There was no operative mortality in this series.

Suture of Abdominal Aorta.—Freeman and Storck report successful suture of the abdominal aorta for an arteriovenous fistula in a 25 year old soldier who was wounded on Okinawa

A complicating factor was the paraplegia resulting from concurrent gunshot wound of the spine. Operative approach to the abdominal aorta through the retroperitoneal space was employed. Increase in the extent of the neurologic damage and temporary renal failure with hypertension and retinal angiospasm were noted in the postoperative period.

Acute Cholecystitis.—Lester reports 109 cases of acute cholecystitis in 72 women between the ages of 17 and 72 years and in 37 men between the ages of 25 and 72 years. Where the temperature was over 102 F. and the white blood cell count was over 15,000, the gallbladder was gangrenous in at least one half the cases. Cholecystectomy is the procedure of choice for acute cholecystitis. Ninety-six of the 109 patients were subjected to it; but even when cholecystostomy was done in the other 13 patients, the majority of them remained symptom free without any further surgery. Stones were found in 106 patients (97 per cent). Of the acutely inflamed gallbladders, 20 per cent were gangrenous. Positive cultures were obtained twice as frequently in the gangrenous as in the nongangrenous, but the proportion of Bacillus coli was approximately the same in the two, suggesting that it may be a secondary invader in the lumen of an inflamed gallbladder. Gangrene of the gallbladder in some cases was due to the obstruction of the cystic duct by stone, causing increased tension within the lumen and interference with venous return. Noncalculous gangrene may be due to the necrotizing effect of an activated pancreatic reflux. Nineteen patients (17 per cent) had jaundice. The gallbladder and liver were enlarged more frequently in these patients than in those with simple acute cholecystitis, but hepatitis was not constantly associated with cholecystitis. Persistence of dyspepsia after cholecystectomy may be due to a dyskinesia of the sphincter mechanism.

Intra-Arterial Penicillin in Infections of Extremities.—Shaffer treated 8 patients with diabetic gangrene and 32 additional patients with gangrene due to arteriosclerosis and frostbite with associated infection, osteomyelitis, suppurative joints, infected ulcerations of the legs and feet and infected operative incisions by intra-arterial administration of 50,000 Oxford units of penicillin dissolved in 10 cc. of saline solution. This technic of injection effectively overcomes the difficulties offered by tissue barriers and vascular impairment in infections of the extremities which reduce the efficacy of penicillin administered intravenously or intramuscularly. There were no untoward reactions. The only contraindications to the method are phlebothromboses or a locally infected area over the site of injection. The method effectively controlled the various types of infections of the extremities with and without tissue necrosis so that surgery was obviated and simplified in many cases, while making possible a better evaluation and preoperative preparation in other cases.

West Virginia Medical Journal, Charleston

43:149-194 (May) 1947

Evaluation of Thiouracil in Hyperthyroidism. G. P. Heffner and R. K. Buford.—p. 149.
*Treatment of Acute Bulbar Poliomyelitis. E. B. Henson.—p. 157.
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Causalgia. F. H. Mayfield.—p. 201.
Modern Influences in Medical Practice: Undergraduate Medical Education. D. W. Clark.—p. 205.

Treatment of Acute Bulbar Poliomyelitis.—Henson shows that by resorting to tracheotomy early, when signs of involvement of the ninth and tenth cranial nerves are present in poliomyelitis and by judicious use of oxygen and suction through the tracheal tube, many lives may be saved. Not all such patients will be cured by this or any other procedure, since the patient's resistance to the disease may be very low and a fatal outcome the inevitable result. It would seem rational to resort to tracheotomy in the severe cases even when seen rather late.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

1:667-706 (May 17) 1947

Oxygen Poisoning in Man. K. W. Donald.—p. 667.
Nicotinamide Saturation Test. P. Ellinger and S. W. Hardwick.—p. 672.
*Tuberculosis as Complication of Diabetes Mellitus. W. R. Gauld and A. Lyall.—p. 677.
A Case of Vitamin C Deficiency. L. I. Hatherley.—p. 679.
"Gammexane" and Mosquito Control. G. Davidson.—p. 681.

Tuberculosis as Complication of Diabetes Mellitus.—Gauld and Lyall describe their observations on 17 patients with diabetes mellitus and tuberculosis encountered during the supervision of 717 patients with diabetes. The diabetes of 11 patients preceded the onset of tuberculosis, while of the other 6 the diagnoses were made simultaneously. Fourteen patients were males and 3 females. In the greater percentage the tuberculosis made its appearance in the fifth decade, whereas in the majority of the general population tuberculosis occurs in the second or third decade. This suggests that tuberculosis developed on account of preexistent diabetes mellitus. The authors stress that poorly controlled diabetes mellitus predisposes to tuberculosis and causes a rapid spread of the disease. A high percentage of diabetic patients acquiring tuberculosis are not adequately treated until the disease is far advanced. This calls for a revision of the diagnostic approach to the problem by routine roentgenography and sputum examinations.

Journal Obst. & Gynaec. of Brit. Empire, Manchester

54:137-280 (April) 1947

Radiography as Aid to Dose Control in Radium Treatment of Cervix. M. H. E. Hulbert.—p. 137.
*Results of Treatment with Radium for Cancer of the Cervix Uteri. R. G. Maliphant.—p. 155.
Note on Fothergill's Colporrhaphy. C. P. Brentnall.—p. 164.
Interpretation of Tests for Renal Function. C. G. Paine.—p. 172.
Riboflavin Deficiency in Pregnancy: Relationship to Course of Pregnancy and Condition of the Fetus. A. Brzezinski, Y. M. Bromberg and K. Braun.—p. 182.
Factors Causing Difficult Labor in Multigravidae. B. Williams.—p. 187.
Anuria Following Criminal Abortion. J. Young and A. H. C. Walker.—p. 196.
Combined Anterior Pituitary Necrosis and Symmetrical Cortical Necrosis of Kidneys Following Accidental Hemorrhage. E. D. Y. Graaby.—p. 203.
Unusual Case of Adherent Placenta Treated in an Unorthodox Manner. A. A. Gemmell.—p. 213.
Avoidance of Catheterization Following Vaginal Plastic Operations. A. A. Gemmell.—p. 215.
Labor in an Iron Lung. Audrey Freeth.—p. 216.

Radium in Treatment of Cancer of Cervix Uteri.—Maliphant reviews the results of radium treatment in 827 cases of cancer of the uterine cervix. Interstitial radium treatment showed a five year salvage figure of 11 per cent; it was satisfactory only in cases in which the disease was limited to the cervix. With the two application Stockholm technic the absolute five year survival rate was 25.2 per cent. Fifteen per cent of the women surviving five years have died of cancer during the succeeding five year period, and even ten year survival after radiotherapy is not synonymous with cure. The best results were obtained in the hypertrophic growths. They produce symptoms earlier than do growths of an infiltrating nature, but they have a more favorable prognosis irrespective of the clinical stage of the disease. The prognosis in adenocarcinoma of the cervix is not so favorable as that in squamous cell cancers, in spite of their tendency to develop as hypertrophic or cauliflower growths. The best results were obtained in the more anaplastic squamous cell cancers—the midripe transitional cell types and the unripe spindle cell types. The duration of symptoms was a poor index of the extent of the disease and therefore of the prognosis. The presence of pain does not invariably indicate advanced disease, but at all stages it has an adverse influence on the prognosis. This survey again demonstrates the importance of early diagnosis. By far the most important factor controlling the permanence of cure is the extent of the carcinoma when treatment is instituted.

Lancet, London

1:659-698 (May 17) 1947

Child Guidance in Old Age. J. M. Mackintosh.—p. 660.
Biochemistry of Inflammation. V. Menkin.—p. 661.
Physical Basis of Continuous Intravenous Infusions. J. N. Walton. —p. 662.
*General Paralysis of the Insane, Treated with Penicillin: Report on 7 Cases. R. H. F. Smith.—p. 665.
Diphtheria and Streptococcal Carriers in London School Children. Members of the Staff of the Public Health Department, London County Council.—p. 668.
*Treatment of Thyrotoxicosis with Propyl Thiouracil. A. Wilson and J. Goodwin.—p. 669.
Treatment of Fistula in Ano. J. P. Lockhart-Mummery.—p. 671.
Neoantergan in the Treatment of Urticaria: Report of 14 Cases. R. B. Hunter.—p. 672.
Shrapnel Shot Through Placenta. B. Zondek.—p. 674.
Paludrine in Relapsing Benign Tertian Malaria: Further Trials. R. D. C. Johnstone.—p. 674.

Penicillin in Dementia Paralytica.—Smith administered calcium penicillin by intramuscular injection to 7 patients with dementia paralytica. Four patients had a first course of 20,000 units every three hours day and night for a total of 1,280,000 units, followed at an interval of a month or longer by a second course of 50,000 units every four hours day and night for a total of 2,400,000 units. Two patients were given two courses of 50,000 units every four hours day and night until a total of 2,400,000 units had been given. The second course was given a month after the end of the first. One patient had one course of treatment of 2,400,000 units. No penicillin was found in the spinal fluid with such dosage. A skin reaction developed in case 2, febrile reactions in cases 1 and 3, and Jarisch-Herxheimer reactions in cases 2 and 6. Serologic results in the spinal fluid were improved with regard to cells and protein, but the colloidal gold and Wassermann reactions were more resistant. The blood Wassermann reactions were unchanged. Clinical results have been encouraging: 4 patients have made a social recovery, 1 has greatly improved, 1 is not improved, and 1 died.

Propyl Thiouracil in Thyrotoxicosis.—Wilson and Goodwin summarize their experience with propyl thiouracil in treating 16 patients with thyrotoxicosis. The results with propyl thiouracil have shown that this drug is about four times as potent as methyl thiouracil. The response to propyl thiouracil is not more rapid than that to methyl thiouracil, and the maintenance dose is slightly greater for propyl thiouracil. Thyroid hyperplasia has not been observed with the doses used. Toxic effects on the skin were seen in 1 patient after seven weeks' treatment with propyl thiouracil. There is no evidence that propyl thiouracil has any particular advantage over methyl thiouracil.

Revue da la Tuberculose, Paris

10:685-924 (No. 11-12) 1946

Doctrine and Motive. E. Bernard.—p. 685.
*Hazard of Toxicity of BCG Vaccine when Given to Infected Persons. L. Nègre and J. Bretey.—p. 694.
Roentgenologic Localization of Suppurating Intrapulmonary Cavities and Their Drainage by the Endobronchial Route. C. Mattéi, M. Tristani and A. Barbe.—p. 704.
Volume and Ventilation of Lungs: Function Test. G. Birath.—p. 717.

Toxicity of BCG Vaccine for Infected Persons.—According to Nègre and Bretey the oral introduction of BCG vaccine in three divided doses of 0.01 Gm. each or in a single dose of 0.05 Gm. given by mouth to children and adults for prophylactic inoculation does not produce any immediate or delayed untoward reactions. BCG given in these doses has no effect on the course of tuberculous lesions in animal and man. It cannot activate latent foci in allergic persons. General or focal reactions are in general not associated with the treatment of the same types of patients with subcutaneous or intradermal injections of BCG. Mild and temporary rise of temperature of less than 1 degree may be observed in certain patients with tuberculosis during the days following these injections, but the lesions of these patients are not activated. Focal and general reactions can be produced in tuberculous patients with subcutaneous injections of larger doses (more than 1 mg.) than those used for vaccination. Repeated injections seem to make these reactions worse. Patients with pulmonary tuberculosis were not benefited nor was their condition made worse by the treatment with cutaneous scarifications which were impregnated with BCG. Unnecessary inoculation with BCG, particularly by the oral route or by cutaneous scarifications, will not produce toxic symptoms in allergic persons or in persons with latent lesions.

Schweizerische medizinische Wochenschrift, Basel

77:395-418 (April 5) 1947. Partial Index

Exposure of Heart by Osteoplastic Thoracic Flap. K. Lenggenhager. —p. 395.
*Intestinal Form of von Recklinghausen's Neurofibromatosis. E. Lindenmeyer.—p. 396.
Icterus Gravis of Pregnancy and Spontaneous Symmetrical Fractures (Syndrome of Milkmann). D. Stucki.—p. 398.
Pathogenesis of Cardiac Asthma. F. Herzog.—p. 404.
Electrical Accident as a Peculiar Biologic Phenomenon. S. Jellinek. —p. 407.
Sympathetic Regulation of Fibrinolysis. T. Halse.—p. 411.

Intestinal Form of von Recklinghausen's Neurofibromatosis.—According to Lindenmeyer, intestinal neurofibromatosis as the only localization of von Recklinghausen's disease is comparatively rare. The patient was a man in whom in the course of the first laparotomy a tumor and 20 cm. of the small intestine were removed. Several years later the presence of numerous nodules on the small and large intestine made removal of all of them impossible, but three pedicled tumors on the descending colon were extirpated, and microscopic examination disclosed that they were neurofibromas.

Deutsche medizinische Wochenschrift, Stuttgart

71:41-80 (June 14) 1946. Partial Index

Observations on So-Called Field Nephritis During After-War Period. H. Assmann.—p. 45.
*Hemorrhagic Reactions in Typhoid Following Vaccination Against It. R. Rössle.—p. 48.
Theories on Origin of Cancer and Their Foundations. W. Schönfeld. —p. 52.
Subthreshold Myocardial Lesions. D. K. Spang.—p. 56.
*Effect of Strophanthin on Coronary Blood Perfusion Considered in Connection with Sensory Manifestations in Heart Region. W. Schmidt. —p. 58.

Hemorrhagic Reactions in Typhoid After Prophylactic Immunization.—The recent typhoid epidemic in Berlin gave Rössle an opportunity to observe the effect of prophylactic vaccination against it. His aim was to determine whether the subcutaneous introduction of killed bacilli exerts any influence on the character, course and outcome of typhoid. A characteristic aspect of those who had been vaccinated was the appearance of hemorrhages at the sites of the typhoid process in intestine, mesentery, spleen and the typhoid granulomas of the liver or at sites of nonspecific sensitization such as the intestinal wall or cerebral meninges. The fatal hemorrhages in patients in whom vaccination against typhoid was performed when the patient was already in the incubation period or typhus was just becoming manifest were especially noteworthy. The author regards them as manifestations of a rapidly occurring change in the endothelial reactions at the sites in question and thinks that they belong to the large group of partially nonspecific pathergias. They are not merely a summation of toxic effects from the endotoxins of the infection with those of the vaccine. The important question of how long before and after infection vaccination against typhoid can be regarded as dangerous remains unsolved.

Action of Strophanthin on Coronary Blood Perfusion.—Schmidt found that some patients complain of a sensation of oppression in the heart region following injection of strophanthin. He found that strophanthin produces in many cases reduction in coronary blood perfusion but that this reduction is reversible and is generally followed by increased coronary blood perfusion. The temporary decrease in coronary blood perfusion is due to changed energy conditions in the myocardium and to increased irritability of the sympathetic nervous system, particularly of the vagus. The sensory manifestations in the heart region following the injection of strophanthin are sequels of changes in the energy exchange in the myocardium and of its effect on the vagus. The increased coronary blood perfusion usually subsides in from thirty to forty-five minutes. The G and K strophanthins have identical effects on coronary blood perfusion.

Book Notices

Techniques and Procedures of Anesthesia. By John Adriani, M.D., Director, Department of Anesthesia, Charity Hospital of Louisiana, New Orleans. Fabrikoid. Price, $6. Pp. 404, with illustrations. Charles C Thomas, 301-327 E. Lawrence Ave., Springfield, Ill., 1947.

This is the third book on anesthesia published by Dr. Adriani. "The Pharmacology of Anesthetic Drugs" (1941) is, as stated in the preface, "an outline limited to fundamentals." "The Chemistry of Anesthesia" (1946) is a consideration in three parts, written in the usual narrative style, of the inorganic and the organic chemistry of drugs used by the anesthetist, the third part being devoted to a discussion of changes in biochemistry accompanying anesthesia.

The present volume, on technics and procedures, reverts to the style of the author's first volume. Again, in the words of the preface, "an attempt has been made in this outline not only to enumerate the technical details of anesthesia but the associated reasons for executing them in the manner described." To avoid disappointment, the prospective purchaser must realize that the book is just that: an outline which enumerates only. Nearly all the various types of anesthesia used in modern practice are covered. Methods of mitigating undesirable effects of each are enumerated. Thirty-six pages are devoted to artificial respiration and inhalational therapy.

The outline style leads to unavoidable dogmatism, and the book thus represents the author's views. In general, however, these are views which are rather widely accepted at this time. It may be doubtful whether such a book is acceptable as a teaching manual for graduate students. As a quick work of reference for undergraduates or technicians its appeal may be greater. The index is adequate. Numerous well placed simple diagrams and photographs clarify the brief outlines of many subjects. The volume is valuable as a quick means of referring to the opinion and practice of the author. Used after mastery of his other two volumes, this book will be found quite adequate by the student. It must be realized that the methods set forth are those of the author, which are in use at Charity Hospital, New Orleans, in 1947.

The Anatomy of the Nervous System: Its Development and Function. By Stephen Walter Ranson, M.D., Ph.D. Revised by Sam Lillard Clark, M.D., Ph.D., Professor of Anatomy, The Vanderbilt University School of Medicine, Nashville. Eighth edition. Cloth. Price, $6.50. Pp. 532, with 417 illustrations. W. B. Saunders Co., W. Washington Square, Philadelphia 5, 1947.

This has been the leading textbook in its field since it first appeared in 1920. An epoch in neurologic teaching and research began at about that time, and the late Professor Stephen Walter Ranson played a leading part in its development. His influence has been felt throughout the country, not only in the more limited sphere of the nervous system, but in all aspects of anatomy, which he so ably helped build into a highy functional and meaningful subject for the student of medicine. During his lifetime he contributed six revisions on this book, earnestly striving to incorporate significant advances and at the same time avoid emphasis of insignificant details. It is remarkable that even after he had ceased to instruct first year students and had become engrossed in highly technical aspects of research, he was able to keep the beginner's point of view in his writing.

It is with universal approval that those who knew Professor Ranson learned that one of his students and colleagues, Professor Sam L. Clark, had agreed to assume the task of further revisions of the Anatomy of the Nervous System. The eighth edition should please all who were devoted to previous ones, for it has maintained the good characteristics while incorporating worth while reorganization and additions.

One of the principal changes in this edition is the shift of consideration of the gross anatomy and of the meninges and blood vessels of the central nervous system to the forward part of the book. From a pedagogic point of view this is a change of considerable value. Consideration of histogenesis of neurons, of neuroglia and of the peripheral nervous system follows this and precedes the detailed structure and function of intrinsic spinal cord and brain structures. Numerous minor changes have been made throughout these chapters of the text, and new illustrations have been added.

One of the important parts of the book is the atlas of brain sections and the accompanying descriptions. This has been improved by addition of a series of parasagittal sections through the brain stem. This part of the book adds a great deal to its value for the student who is learning neuroanatomy, but it is likewise useful to any one who wishes to use the book for reference. There is no doubt that the volume will continue to meet with favor among the members of the medical profession.

Elsevier's Encyclopaedia of Organic Chemistry (in 20 Volumes). Edited by E. Josephy and F. Radt. Volume 14: Tetracyclic and Higher-Cyclic Compounds. Series III: Carbolosocyclic Condensed Compounds. 1940. Cloth. Subscription Price, $45; Serial Price, $52.50; Single Volume Price, $60. Pp. 711. Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, [1946].

The proposed set of twenty volumes represents an attempt to produce a "standard work in English to give complete information on all chemical and physical properties and on the most important physiological properties of organic compounds."

Volume 14, the first of the projected series to appear, covers the tetracyclic and higher-cyclic compounds of organic chemistry, including sterols and triterpenes. Completed in 1940, it was delayed because of the war. This unfortunately aggravates, in the present case, a defect that is inevitable in large works of this sort. They can never be very up to date, and in the present volume only the literature through 1936 is thoroughly covered with the exception of a few late references. Since these volumes are scheduled to appear at intervals of about six months, it is hoped that future volumes will carry more up to date reference lists.

Sufficient emphasis has been placed on the physiologic and biologic actions of the compounds listed to warrant its use by other than chemists to whom the series will be of primary interest. Pharmacologists, especially, will find inspiration in such pages as 413 and 494, where the interesting possibilities in higher-cyclic compounds are suggested by collections of skeleton formulas. They indicate that it will be a long time before research workers exhaust the therapeutic possibilities of organic chemistry.

Like the "Organische Chemie" of Beilstein, these volumes are to be divided into three sections corresponding to the aliphatic, carbocyclic and heterocyclic series of organic compounds. From this division a systematized plan of presentation is followed. No new systems of nomenclature are to be used. Each volume is to have a subject and a formula index. The indexes are to contain, besides the individual compounds, lists of compounds similar in structure or function, e. g., compounds with triple bonds, carcinogens and hormones.

In this, the first, volume to appear are included data on many carcinogenic agents, sex hormones, naturally occurring compounds, vitamins and provitamins, cardiac glycosides, bile acids and others which fall in this particular organic classification. Besides a table of contents for each ring system, data are included on occurrence, formation, preparation, reactions, detection, physical and chemical properties, derivatives, reaction schemes with many structural formulas, and literature, subject and formula indexes.

The volume contains a huge fund of information and along with the rest of the series is probably destined to become a primary source of information. English scientific literature needs such an encyclopedia.

Principles and Practice of Obstetrics. By Joseph B. De Lee, M.D., and J. P. Greenhill, M.D., Attending Obstetrician and Gynecologist, the Michael Reese Hospital, Chicago. Ninth edition. Cloth. Price, $10. Pp. 1,011, with 800 illustrations. W. B. Saunders Co., W. Washington Square, Philadelphia 5, 1947.

De Lee's Obstetrics, as it has been referred to so long and so warmly, appears again in its ninth edition under the skilful direction of J. P. Greenhill. It is true that this book was recognized as a classic during De Lee's lifetime when he was the sole author. The fact that it goes on under the momentum of his authorship, still acclaimed, indicates its stature more clearly than ever before.

Greenhill has made many well chosen additions, and necessary changes in accordance with current obstetric advances. Since

he assumed direction of the revisions of this book his choice of subjects to keep the book closely up to date has been an especially noteworthy feature. In the eighth and this ninth edition, the book has been largely rewritten, but nothing of De Lee's fluid and easily understandable style has been lost. One innovation in format, questioned at first, is the double column on each page. In a book as large as this one has always been, the double column setting seems to make easier reading when one becomes accustomed to it. The paper is excellent, the printing clear and even, and the binding well done.

Several new chapters have been added, and old ones have invariably been changed to add accepted new findings or procedures. Analgesics and anesthetics in labor and delivery are an example. The subject of blood transfusions during labor could perhaps be amplified to advantage. The modern treatment of puerperal infection with sulfonamides and penicillin is thoroughly described and directed. Some illustrations have been added, although these were scarcely needed, as the book has always been noted for its profusion of splendid pictures. Greenhill adheres to De Lee's preference for mediolateral episiotomy, but for those who utilize the median incision a limited set of illustrations of the latter would be helpful for practice and for teaching.

One of the many features should be referred to, simple as it is. The index includes one important teaching item usually not found in an index. In addition to a careful indexing of textual subject matter, the illustrations are also tabulated by subjects. For quick reference and to distinguish these, the page numbers are set in different type, bold face for text, italics for illustrations. The book is to be strongly commended to all who have any interest in obstetrics, to students, to practitioners and to specialists without distinction.

Russian-English Technical and Chemical Dictionary. [Compiled] by Ludmilla Ignatiev Callaham. Fabrikoid. Price, $10. Pp. 794. John Wiley & Sons, Inc., 440 4th Ave., New York 16; Chapman & Hall, Ltd., 37-39 Essex St., Strand, London, W. C. 2, 1947.

Compilation of this dictionary was begun to prepare "a convenient reference for chemists and chemical engineers in both the chemical and process industries." This was certainly achieved successfully. However, since no one field of science or technology is sufficient unto itself and enclosed within rigid lines of demarcation—rather, the boundary lines between it and other fields from which it of necessity borrows and with which it collaborates are blurred and indefinite—the inclusion of terms in this work was broadened to give a quite comprehensive coverage of many related fields, such as pharmacy and botany. It is to be hoped that the dictionary will be expanded in the future, preferably to include more purely scientific terms, those of value, for instance, to readers of medical and biologic literature.

The author points out a fact that will be conceded by any one who has dealt with foreign languages, namely that it is necessary to have at least an elementary knowledge of Russian to use the dictionary. For instance, to be specific, an English speaking person without knowledge of Russian would encounter difficulty in looking up nouns and verbs; the former, of course, frequently occur in the Russian text in other than the nominative case in which they are given in the dictionary, and the latter in another form than the infinitive which appears in the dictionary.

The preface of the book is helpful in that it explains such points as handling translation of "Russianized" words, with examples. A Russian alphabet with transliteration, a table of common Russian technical word endings and a list of the reference sources on which the dictionary is based are carried at the front of the book.

The Head, Neck, and Trunk: Muscles and Motor Points. By Daniel P. Quiring, Ph.D., Head of the Anatomy Division, Cleveland Clinic Foundation and Associate Professor of Biology, Western Reserve University, Cleveland. Fabrikoid. Price, $2.75. Pp. 115, with 103 illustrations. Lea & Febiger, 600 S. Washington Square, Philadelphia 6, 1947.

This book is a companion volume to the author's "The Extremities." Its purpose is to portray in diagrams and condensed descriptions the striated muscles of the head, neck and trunk. It offers an exact account of the skeletal attachments, nerve and chief arterial supply, and functions of these muscles. The diagrams are based on original dissections and on references to the anatomic literature. The presentation has the advantage of clarity. Each muscle is shown in a single diagram together with its concise description. It is a fine example of limiting the nonessentials. It permits a rapid survey of skeletal-muscular anatomy. The line drawings are excellent. The general motor points of the face are shown in a single illustration. As a quick and handy guide it will undoubtedly find considerable usefulness. Medical students particularly will find this work helpful for review purposes. It should be valuable to students and to physical therapists. Surgeons will find it a useful reference work. Physical education departments in colleges and universities offer courses in human anatomy sometimes with actual dissections. This book is suited to such a course.

Tumores y neodotomoros de la mama: Estudio de investigación experimental, su profilaxis y tratamiento. Por el Dr. Jacinto Moreno. Paper. Pp. 142, with 40 illustrations. Lopez & Etchegoyen, S. R. L., Junin 863, Buenos Aires, 1946.

This rather detailed monograph on tumors of the breast is well presented, is profusely illustrated and reveals a studious understanding of the subject matter. Although some of the ideas presented are at variance with the concepts generally accepted in this country, the rationale of the conclusions reached by the author is of interest. His classification of breast tumors discussed is relatively simple and avoids the complexities of some classifications. His discussion of the hormonal influence in the development of cancer is concise and to the point. It agrees in the main with the concepts of Novak and Geschickter and others. The author is emphatic in his statement that, based on his observations, all malignant breast tumors metastasize within two years, irrespective of the type of therapy used. This, of course, will not be universally accepted. He condemns breast amputations in suspected lesions, such as the mastitides, or as a prophylactic measure in questionable cases. A complete and exhaustive study of the patient prior to surgical intervention will frequently reveal, he states, coexistence of tumorous growths elsewhere in the body; if so, surgery is definitely contraindicated. The author concludes that all patients with cancerous growths of the breast show some type of endocrinopathy with abnormal metabolic changes; the endocrine deficiency is related to the sex organs; the patients show hyperglycemia, increased blood phosphorus and decreased blood calcium contents. The monograph fails to include any statistical studies to corroborate these findings, nor are any biochemical studies reported to confirm the author's statements.

Your Rheumatism and Backaches. By Joseph D. Wassersug, M.D. Cloth. Price $2.50. Pp. 310. Wilfred Funk, Inc., 227 E. 44th St., New York 17, 1947.

Dr. Wassersug presents in this handy volume excerpts from a limited store of contributions. The book contains numerous case reports culled from the literature, and some controversial aspects of the problem are presented. Many a senior medical student could gather twenty or more articles and write a similar book in his own room without seeing one case of arthritis.

Diseases of the Nose and Throat. By Charles J. Imperatori, M.D., F.A.C.S., Consulting Laryngologist, Harlem Hospital, and Herman J. Burman, M.D., F.A.C.S., Director of Department of Otolaryngology, Harlem Hospital, New York. Third edition. Fabrikoid. Price, $12. Pp. 576, with 480 illustrations. J. B. Lippincott Co., 227 S. Sixth St., Philadelphia 5, 1947.

In this edition the authors have somewhat altered their format, utilizing the popular two column style. One is impressed by an attempt to present in terse, almost outline, form the numerous diseases associated with the nose, throat and larynx. Certain chapters, such as those on roentgenology and laboratory procedures, have been presented by competent collaborators. There are a number of specific objections which could constructively be stated about the book. For the undergraduate much of the material does not fit into his needs, and for the postgraduate in rhinolaryngology it is not complete enough. While it is clear that some sections of the book may be of value to the trained specialist, it will take other editions to allow the authors to bring more uniformity into the work generally and to amplify areas that have been too briefly stated for a purposive study. Attempts at specific review of subjects where brevity is the keynote is admirable but not always practical. Pictorial material in the book could be greatly enhanced and its therapeutic content sifted in the light of modern concepts.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

FOOT BATHS IN LOCKER ROOMS

To the *Editor*:—What is the present consensus with regard to the value of foot baths in locker rooms, swimming pools and gymnasiums for preventing the spread of ringworm? A few years ago sodium hypochlorite solution was recommended; is this still considered of value? Also there are commercial solutions on the market. Is there much chance of skin irritation from any of these foot bath solutions?

M.D., Illinois.

ANSWER.—There is much less use of antiseptic foot baths in locker rooms, swimming pools, and similar places in attempting to prevent ringworm of the feet now than formerly. Sodium thiosulfate 10 per cent is much less used. Sodium hypochlorite 1 per cent seems to have more adherents, but the solution should be changed probably every forty-eight hours. Little skin irritation has been seen from any of these foot bath solutions. A study of dermatophytosis in industry by the U. S. Public Health Service showed that there was no value to foot baths and copper impregnated flooring in preventing the spread of tinea pedis. The National Research Council in 1944 recommended that foot baths for the prevention of tinea pedis should not be used by our armed forces.

In a paper read before a Congress on Industrial Health, Schwartz recommended the use of individual wooden sole bathing slippers to be worn in and out of shower baths and the thorough drying of the feet, especially the interdigital spaces, as the logical method of preventing the spread of tinea pedis in locker rooms and shower baths. If commercial solutions on the market for use in foot baths are of sufficient concentration to kill fungi on the feet in the short time that the feet are immersed or sprayed by them, they are likely sources of skin irritation.

DERMATITIS FROM ENDOCRINE PREPARATION

To the *Editor*:—A woman was given for menopausal symptoms a pink liquid smelling like paroperic that acted physiologically like the hormones of pregnant mare's urine. She developed a red, dry, scaling dermatitis of the face. Can the medicine be the cause of the dermatitis?

M.D., Pennsylvania.

ANSWER.—The preparation which was administered in the form of a pink liquid would probably be an elixir containing extracts of the urine of pregnant mares containing the fractions with estrogenic activity. Such extracts contain a number of estrogenic substances, although the chief activity is due to estrone, with some effect contributed by the weakly estrogenic steroids such as beta estradiol, equilin and hippulin. There is little evidence available which would indicate that human beings are sensitive to these steroid compounds, especially when taken by mouth. It is barely possible that the patient reacted to the medication by increased nervousness and tension, a not uncommon reaction following the administration of rapidly absorbed estrogens. If this occurred it is possible that the rash might be considered of neurogenic origin. In view of the relative impurity of these extracts, however, the patient could have been allergic to one of the contaminants in the preparation. The administration of a purer oral estrogen is advised to gain a better understanding of the patient's response.

EARLY GLAUCOMA

To the *Editor*:—Will you please tell me the early symptoms of glaucoma? I should like to know more about how to diagnose glaucoma and the latest treatment.

M.D., Oklahoma

ANSWER.—Chronic simple glaucoma manifests itself earliest in an enlargement of the blind spot, as shown by a test of the central fields. Usually serious loss of the vision of one eye has occurred before the patient knows of any trouble at all. The tonometer is necessary to determine the exact tension of the eye. Low tensions can many times be controlled by pilocarpine; physostigmine is needed in more severe cases; doryl is a newer drug which is effective in many cases. As soon as the central fields begin to get worse, operation (trephining, cyclodialysis, iridodenclesis) must be resorted to and are quite uniformly successful.

BISMUTH SALTS IN TREATMENT OF RHEUMATOID ARTHRITIS

To the *Editor*:—I have read with interest the several reports published in the last several years concerning the use of aqueous bismuth solutions intravenously for the treatment of undulant fever and follicular tonsillitis, reference being made to its safe use therein. Also a report using 0.5 cc. intramuscularly at monthly intervals for arthritis. Would it be logical to assume that the action of bismuth intravenously is any different from its use intramuscularly? Are there any reports pertaining to the use of bismuth intravenously or intramuscularly in the therapy of rheumatoid arthritis, using the bismuth compound in place of gold salts?

Clifford W. Atherton, M.D., Fairview, Ill.

ANSWER.—In an effort to find an equally effective, less toxic preparation than gold salts in the treatment of rheumatoid arthritis, Taray (1941) used colloidal bismuth, also colloidal platinum and selenium. Injections of these colloids into a few patients "gave insufficient promise of therapeutic usefulness" and were then not continued. Colloidal gold was more effective.

Also as a possible substitute for gold salts Douthwaite (1944) independently used intramuscular injections of bismuth salicylate (200 mg. doses repeated weekly for ten weeks). Toxic reactions did not occur. Of 12 patients with rheumatoid arthritis so treated significant improvement resulted in 6. It was concluded that bismuth salts were less toxic and less effective than gold salts. Relapses occurred more quickly than with gold salts. Gold resistant arthritis was considered unlikely to benefit from bismuth. Bismuth was "indicated only for rheumatoid arthritic patients who show intolerance, whether physical or mental, to gold."

Because injections of sodium bismuth tartrate (a water soluble salt of bismuth) appeared to relieve yaws with its "rheumatic-like" manifestations, Hall (1944) used such injections for a variety of conditions, chiefly rheumatoid arthritis but also for osteoarthritis, "arthritis deformans" and even Paget's disease. Injections were given intramuscularly (generally intragluteally) every four to eight weeks for a variable number of doses (totaling not more than 12 grains [0.78 Gm.]) each dose being ½ to 1 grain (0.032 to 0.065 Gm.). Serious toxic results were not noted. The diagnostic terminology used was not clear, and the illustrative case reports were so brief as to be of little value. Statistical results were not given. Hall merely stated that "improvement of varying degrees should be expected in at least 60 per cent of cases."

In a second report published a year later (1945) Hall again recommended this treatment, chiefly for rheumatoid arthritis, in small doses (½ grain) given by intramuscular injection every four to six weeks for a total of six injections. No serious toxic effects were noted as a result of "thousands of doses," but overdosage sometimes produced exacerbations of articular symptoms. Again no statistical or clinical proof was offered to support the author's impressions as to the effectiveness of this treatment. Although toxic reactions from these doses were not reported, bismuth, being a heavy metal, may and sometimes does produce toxic reactions in syphilitic patients so treated. "Pharmaceutic arthralgia" or articular pains with swelling ("paratherapeutic arthritis") may occur (Hollström). In about 10 per cent of one group of syphilitic patients "bismuth hepatitis" developed; it was generally transient and nonfatal but occasionally fatal (Kulchar and Reynolds). Stomatitis, pharyngitis, fever, leukocytosis and albuminuria may occur from overdosage (Seifter and McDonald).

Intramuscular injections are considered less toxic than intravenous injections of bismuth which result in the rapid absorption of relatively large amounts. Water soluble compounds are more toxic than colloidal compounds.

In conclusion it remains to be shown that preparations of bismuth are of value in the treatment of rheumatoid arthritis.

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Kulchar, G. V., and Reynolds, W. J.: Bismuth Hepatitis: A Survey of 121 Cases, THE JOURNAL, Oct. 3, 1942, p. 343.

Seifter, Joseph, and McDonald, F. M.: Urinary Excretion of Bismuth Following Large But Nonfatal Dose of Bismuth Subsalicylate, *ibid.*, Sept. 18, 1943, p. 149.

PERIARTERITIS AND MIGRATING THROMBOPHLEBITIS

To the Editor:—1. Why are the veins not involved in diffuse vascular disease such as periarteritis nodosa? 2. What are the etiologic factors behind recurrent migrating superficial thrombophlebitis involving at various times the upper and the lower extremities and axillae, thromboangiitis obliterans, fungous infection and trauma being ruled out.

Ray J. Peplin, M.D., Los Angeles.

ANSWER.—1. The etiology of periarteritis is unknown. Rich reported that the arterial lesions of periarteritis nodosa may be dependent on increased sensitivity of tissue to foreign substances. He reported a series of cases of serum sickness and reactions to sulfathiazole in which the lesions of periarteritis nodosa were found. Rich and Gregory sensitized animals to horse serum and a few days later injected horse serum; widespread lesions of periarteritis nodosa developed. They concluded that "periarteritis nodosa is a manifestation of anaphylactic hypersensitivity, and widely different sensitizing antigens can be responsible for the development of vascular lesions in patients." Veins are injured rarely in periarteritis nodosa, but this may occur. There is no explanation for this situation.

2. Migratory superficial thrombophlebitis may be a manifestation of thromboangiitis obliterans or of cancer chiefly of the lung, pancreas and stomach and may occur in polycythemia. Occasionally rather minor degrees of trauma may cause venous thrombosis. The role of fungous infections is uncertain. In some instances careful study indicates an increased tendency of the blood to coagulate. Thromboplebitis of course occurs commonly in varices. In many instances recurrent phlebitis is not secondary to any detectable cause but is a disease in itself known as idiopathic recurrent thrombophlebitis.

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CHEMOPROPHYLAXIS FOR TONSILLECTOMIES AND EXTRACTIONS

To the Editor:—A discussion has been developing in local medical circles as to the value of the use of penicillin during tonsillectomy in cases of rheumatic polyarthritis and endocarditis as a preventive measure against new exacerbations of the quiescent disease. My own experience is still scanty and I still miss the extensive American and British literature about the different aspects and possibilities of penicillin therapy.

F. Dobihal, M.D., Prague, Czechoslovakia.

ANSWER.—It is generally agreed that chemoprophylaxis is indicated for any person who has had rheumatic fever, particularly for one who has a residual endocardial lesion and who is to have oral surgery such as a tonsillectomy or extraction of teeth. A transient bacteremia following such procedures might well precipitate an attack of rheumatic fever or result in the establishment of bacterial endocarditis. The sulfonamides have been employed for this purpose as well as penicillin. Up until recently the limited supplies of penicillin have been devoted to the treatment of established infections rather than for prophylactic purposes, although penicillin was utilized prophylactically in the management of war wounds. It is suggested that one to two hours prior to tonsillectomy 300,000 units of penicillin in a beeswax-peanut oil preparation should be injected intramuscularly. This amount may then be given every twenty-four hours after tonsillectomy for one or two days. These amounts should provide adequate levels in the serum. The sodium salt of penicillin may be dissolved in sterile saline solution and given intramuscularly at more frequent intervals, if desired.

GROWTH AND DEVELOPMENT OF INFANTS

To the Editor:—Could you kindly give me references on the long term follow-up on growth and development of three groups of infants, those who (*a*) exhibit neonatal erythroblastosis, (*b*) suffer severe neonatal cyanosis, (*c*) are premature.

Elizabeth Kirk Ross, M.D., Philadelphia.

ANSWER.—(*a*) References as to long term growth and development of infants who exhibit neonatal erythroblastosis are: Zimmerman, H. M., and Yannet, Herman: Kernikterus, *Am. J. Dis. Child.* **65**:740 (April) 1933. This report deals only with one phase of the residua of this condition. Recently published is a book (Rh: Its Relation to Congenital Hemolytic Disease and to Intragroup Transfusion Reaction, by Edith L. Potter, Chicago, Year Book Publishing Company, 1947) which contains some follow-up infor.nation on this condition.

(*b*) In infants who suffer neonatal cyanosis the question is difficult because cyanosis is but a symptom in various conditions and diseases. In the older literature "asphyxia livida" was the term used to denote cyanosis at birth and was divided into intrauterine and extrauterine causes. Norman W. Clein (Premature Infants, *Am. J. Dis. Child.* **37**:751 [April] 1929) studied cyanosis in premature infants in the early neonatal period. Among the causes of newborn cyanosis one might mention congenital heart disease, atelectasis of the newborn, intracranial hemorrhage, aspiration pneumonia and a variety of other conditions which might have to do with the failure of circulation or blocking of air passages. References on follow-up of infants exhibiting neonatal cyanosis would therefore depend on the exciting cause.

(*c*) One of the best references on follow-up on growth and development of premature infants can be found in The Physical and Mental Growth of Prematurely Born Children, by Julius H. Hess, George J. Mohr and Phyllis F. Bartelme, University of Chicago Press, 1934.

GILT USED IN PRINTING TRADES

To the Editor:—What pulmonary and systemic symptoms and pathologic change might be expected in those who work in an environment in which the air is continually saturated with particles of gilt used on the labels of alcoholic beverages?

M.D., Maryland.

ANSWER.—Gilt powders as used in printing ordinarily contain finely divided particles of brass or bronze, hammered out from small ingots of such metals. Some brasses and bronzes contain appreciable quantities of lead by design or as an impurity. As a rule, brass or bronze later pulverized is essentially lead free. Lead poisoning from this source is an unlikely hazard. Otherwise this dust in the atmosphere is to be regarded merely as a nuisance and high atmospheric contamination is well tolerated. Nothing analogous to silicosis will develop, although after prolonged, extensive exposure a mild condition discernible in the chest x-ray film may appear to which the term "benign pneumonoconiosis" is applicable. Likewise gross exposure may lead to minor irritation along the respiratory tract on a mechanical basis. In this type of printing operation the area to be covered by gilt may first be printed with glue. The constituents of this glue are not constant. It is possible that sensitization to the glue rather than to the gilt may arise, so that asthma or other indication of an allergic state may be in evidence. Such a state has arisen from gum arabic as applied in printing operations. The upper limit of tolerance for nuisance dusts approximates 50 million particles per cubic foot of air. Any excess over this level should be controlled by appropriate exhaust systems.

HIRSUTISM

To the Editor:—I have heard indirectly that areas of hirsutism can be successfully treated by the local application of an ointment containing, I think, testosterone propionate. Kindly discuss the local application of hormone preparations to areas of hirsutism. Please give references in the literature.

M.D., Colorado.

ANSWER.—Any patient with hirsutism should have endocrinologic studies to rule out organic pathologic conditions such as Cushing's disease, arrhenoblastomas and the adrenogenital syndrome. If negative, the generally preferred method of permanent removal of superfluous hairs is by electrolysis. It has been reported in the literature that as little as 450 mg. of testosterone propionate has produced hirsutism.

HEXAETHYL TETRAPHOSPHATE

To the Editor:—Concerning the question in Queries and Minor Notes for June 21, 1947 regarding the toxic effects to be expected in man from the insecticide hexaethyl tetraphosphate: It should be emphasized that if the oral toxicity figures in animals are translatable to man, as little as 0.35 cc. (about 5 drops) may be fatal if ingested. Hexaethyl tetraphosphate is a very potent anticholinesterase agent (such as physostigmine, neostigmine and di-isopropylfluorophosphate) and this fact allows certain toxic effects in man to be anticipated although severe poisoning has not been reported. Miosis, feeling of constriction in the chest, increased gastrointestinal and salivary activity, headache and skeletal muscle twitching may be expected. A complete symptom of severe poisoning in certain experimental animals, as observed in this laboratory, is dyspnea with extreme cyanosis (bronchospasm?) controllable by atropine when given prophylactically or early in the course of poisoning. Though the studies are incomplete, it appears that the use of atropine and other parasympathetic depressants and sympathomimetic and other bronchodilator drugs in suitable dose and at proper intervals should provide the rational basis for the drug therapy of acute hexaethyl tetraphosphate poisoning. Artificial respiration should be promptly instituted if such drug therapy fails.

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